

The Mining Journal

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Tightening the Copper Belt

LAST year when the chairmen of the two Rhodesian producers were reporting, they were looking back over their shoulders to a departing prosperity and facing a period of reduced profit margins. But what they were called on to face was something much more uncomfortable than they then were forecasting. "The reaction, though foreseen, has been sharper than most observers in the industry would have cared to predict two years ago" complains Sir Ronald Prain. Later he adds in his statement to Roan Antelope shareholders "the short-term outlook has seldom been more confused" and Sir Ernest Oppenheimer, addressing himself to the Rhokana shareholders says "it is difficult to foresee the duration of the current recession in general economic and industrial activity".

These quotations set the tone of the reports that come this year from the Copperbelt. It is a sober tone and there is no attempt to forecast what the profitability of the coming year's working is likely to be. Yet it is an extraordinarily confident tone. Two facts account for the confidence; one is the belief that there is a good long-term future for the metal and that this must at some time assert itself; secondly, whatever the strains that lie ahead of the world's copper producers, the Rhodesian copper mines are as well equipped to stand them as any others.

Given that the groups face the long-term with equanimity, how are they shaping up to the present difficulties? The immediate problem is the current price of the metal. Sir Ronald Prain is forthright on this matter. "This question is that of how to avoid the extremes of high and low prices which have characterized the last two years, and which in fact have been a feature of the copper industry in a lesser degree over a much longer period. Of the various suggestions which have been put forward on occasions in the past, none appears to me to offer a better chance of stabilizing the position than for the larger producers of the world to impose voluntary restriction of output. . . We have shown where our opinion lies by voluntary reduction of our output to 90 per cent of capacity".

Sir Ernest appears to be of a different mind. "The copper companies of the Rhodesian Anglo American Group . . . have announced no such cuts in production; but in fact circumstances will result in an involuntary and transitory reduction in planned output for the group of over 10 per cent for the current year".

Both groups are clear that you cannot sell copper to a buyer who has more than enough. But Sir Ronald is outspokenly in favour of some sort of output regulating agreement among the big producers, at least when a glut of copper threatens. By doing so, he of course immediately lays himself open to the charge of recommending a cartel for the metal. It is, of course, quite obvious that a restriction of output would be the quickest way to lift the price; but nowadays there is some feeling against an output regulating agreement which is operated by the producers alone.

It is among the principles of international commodity agreements that they should be made between governments and not between companies and that they should equally represent the views of both producers and consumers.

The other interesting feature of Sir Ronald's suggestion is that it contains no reference to the fair price which he has from time to time in the past recommended as giving a fair return to the producer while maintaining the growth factor of the metal. Plainly any price stabilization scheme must be built around a price and a price range. It would be interesting to know at what price Sir Ronald would have liked to impose a restriction and at what price he would be prepared to lift it.

Both chairmen are concerned at the effect that the fall in the copper price is having on development plans on the Copperbelt. The most obvious direct results is that the opening up of the Chambishi mine has been put off until "more favourable financial conditions" arise. Quite simply it has been impossible to raise the capital required at a price which would make opening up attractive.

Sir Ernest, too, in his report on Bancroft Mines has had to admit that "the early months of production have not been smooth". Physical difficulties underground had a large responsibility, but of course the difficulties meant not only slow progress but a greater need for capital. The result was that fresh funds had to be sought in February, in April and again in September, and these operations had to be carried through at a time of progressive hardening of money. It is a tribute to Sir Ernest's faith in Bancroft that he concludes "It is in our interest to make arrangements for the permanent financing of the company as soon as possible, and I hope that it will be possible to devise a scheme to this end in the next few months".

Both chairmen referred also to the difficulties that face the Federation, because of the lower levels of copper prices. Sir Ernest is confident that the Federation and Territorial governments will "continue to follow a courageous policy of development". He is conscious of the reduction in revenue that the lower copper prices involve, and also of the greater cost of attracting capital from outside in view of the world capital shortage.

He also comments on the fact that Rhodesia is "obliged to import a large range of commodities which are at present suffering from inflation brought about chiefly by demands for higher wages and shorter working hours, unaccompanied by higher productivity". The facts of international trade statistics and the accuracy of the description, together show that the United Kingdom was very much in mind when Sir Ernest wrote these words. There is no doubt that, were inflation to be overcome in the United Kingdom, conditions on the Copperbelt could be much improved. United Kingdom industrial production could be allowed to advance again, money would be cheaper to borrow, and exports to Rhodesia could be stable and perhaps even cheaper. But the contrast between the low level of copper prices (and for that matter, the low level of nearly all commodities) and the still rising level of many manufacturers is a stark one.

This contrast has been pointed out many times in the debates on international commodity agreements conducted at GATT and in the various economic committees of the United Nations. The primary producers have been demanding, for the past three years, that commodities should be stabilized, not in cash terms but in terms of the manufactures that primary producers must import. This, of course, is not precisely what Sir Ernest said but it would be surprising if the contrast which he draws is not prayed in aid by those who are anxious to promote commodity-manufacture balancing agreements.

LAST YEAR "DOWN UNDER"

The value of production of the Australian mineral industry in 1956 was a record at £A214,500,000, 1955 production being valued at £A199,905,000. Most minerals contributed to the increase, but the principal factors were the raises in production of lead, copper, zinc and iron, and the abnormally high prices and greatly increased production of rutile. This is revealed in the 1956 review of the Australian mineral industry, released by the Bureau of Mineral Resources.

Approximately £A207,800,000, or 97 per cent, of the total value of production comprised metals and minerals each with a production value in excess of £A1,000,000 for the twelve months. These were coal, silver-lead, iron, copper, building stone and road metal, zinc, gold, rutile concentrates, tungsten, limestone, clay, tin, and pyrite and sulphur in roasted sulphides. The two principal industries, in terms of value of production, were lead-zinc (£A58,000,000) and coal (£A57,202,000). The value of the refinery production of gold was £A16,346,000.

Metal and mineral exports (excluding gold) in 1956 were valued at £A77,369,000 compared with £A71,489,000 in the previous year. The increase was due mainly to greatly increased shipments of rutile concentrates at higher prices, and to increased shipments of copper, lead and zinc. Exports of silver were unusually high because of returns of lend-lease silver to the United States. It is estimated that total exports in 1957 (excluding gold) will not exceed £A65,000,000. Lead and zinc exports in 1956 were valued at £A40,900,000 or 59.3 per cent of the total. With the addition of by-products, the lead-zinc industry contributed 70 per cent to all mineral exports in 1956.

Metal and mineral imports (excluding gold) in 1956 were valued at £A66,000,000 compared with £A59,100,000 in 1955. Imports of crude mineral oils increased from £A35,000,000 in 1955 to £A52,600,000 but there was a considerable reduction in imports of copper, asbestos and aluminium. Imports other than crude oil, which represented 80 per cent of the total value, amounted to only £A13,400,000 as against £A24,100,000 in 1955, the principal items being aluminium, phosphate rock, sulphur and asbestos.

The total value of the fixed assets of the mineral industry as a whole (mining and treatment) was approximately £A197,648,000 in 1955, the latest year for data.

A GREAT EXPORT MARKET

The arrival in Britain at the end of this week of a high-powered Canadian trade mission under the leadership of the Minister of Trade and Commerce, Mr. Gordon Churchill, is to be warmly welcomed on every count. During recent months a greater fund of goodwill towards this country has developed in Canada than perhaps at any time since the war and early post-war years. It is a fortuitous, but nonetheless happy, circumstance that this rising tide of public sentiment should coincide with economic circumstances within Canada, which dictate that she should plan to switch a proportion of her imports away from the United States during the coming years. This is in anticipation of the rising flow of payments from Canada to the United States required to service the large volume of American risk capital which has gone into Canada in recent years and which from now on must be expected to yield increasing dividends. Here is an outstanding opportunity for British industry.

Mining equipment is included in a short list of types of

equipment in which the mission is stated to have a special interest, and this is confirmed by the fact that three members of the mission are themselves engaged in Canada's booming mining industry—Mr. F. M. A. Noblet, Vice-President of International Nickel, Mr. V. C. Wansbrough, Vice-President and Managing Director of the Canadian Metal Mining Association and Mr. J. B. White, Vice-President and General Manager of the Aluminium Company of Canada.

International Nickel currently has on hand the £40,000,000 purchasing programme for its Mystery-Moak project in Northern Manitoba, not to mention a further £20,000,000 for ancillary items such as a new township, hydro-electric power installations and a 30-mile railway spur. Alcan—itself part of a worldwide and rapidly expanding organization—has yet to complete its own vast Kitimat project.

Mr. Wansbrough, it will be recalled, was a member of the delegation sent to this country by the Canadian Metal Mining Association, almost exactly two years ago, for the purpose of ascertaining how far the British mining machinery manufacturers were then in a position to expand their exports to Canada.

Lest Mr. Wansbrough or any of his colleagues may be inclined to conclude from the somewhat negative outcome of this earlier mission that British mining machinery manufacturers are too preoccupied with the demands of the home market to develop a vigorous sales policy in Canada, we hasten to assure them that this is today far from being generally the case. Whatever grounds there might have been for such a conclusion two years ago, the picture has undoubtedly changed since then.

Not only does the British Government's tight money policy provide a powerful incentive for manufacturers to swing more of their sales abroad, but what is of perhaps equal importance for the far-sighted manufacturer is the realization that, however pressing may be the present demands of the National Coal Board on their productive capacity, the time is now at least foreseeable when these will level off, and in some categories, actually diminish. Export markets take time to develop and it may be none too soon to begin to hedge against a shrinking home market.

Nor are the prizes to be won in the Canadian market in any way negligible. Two years ago, Canada was reported to be importing mining equipment to the value of about £8,000,000 per annum. Of this, some 87 per cent was coming from the United States compared with 5 per cent from Britain. We would doubt whether these proportions have altered very much in the interval, although the total value of imports has probably grown.

While we can, therefore, confidently assure our visitors that a most cordial welcome awaits them from the growing body of mining machinery manufacturers who are anxious to develop their export markets, we fear lest this may not at first sight be apparent from a study of the itinerary planned for the first fortnight of the visit. Indeed, it appears from this all-embracing programme that although during the first week the mission will be visiting such centres as Bristol, Cardiff, Coventry and Birmingham, members of the mission will during this time only have the opportunity of visiting one firm which can be regarded as a substantial supplier of mining machinery.

Even though during the second week (when the mission will visit the Glasgow-Edinburgh and Manchester-Liverpool areas, followed by a number of plants in Yorkshire and Northern Ireland) the situation is a little better, it remains true that in each of the centres at which the mission will stop, there are several major mining machinery manufacturers, not on the official itinerary, who will certainly

be anxious to meet the mining members of the mission, and with whom these latter could, we suggest, more usefully spend their time than with the representatives of industries in which they may be less directly interested.

It is to be hoped that the mining machinery manufacturers in these various centres will not be discouraged by the formal itinerary (which already provides a considerable degree of flexibility) from extending invitations to the mining members of the mission while they are in the neighbourhood. The prerequisites for success in the Canadian mining market have been set out too often in these columns to need restatement now. Here is a great opportunity to examine these requirements more closely.

The third week of the mission's visit has been deliberately left free for individual members to visit industries in which they have a special interest. This is, of course, a wise provision, and one can only wish that it had been possible for this part of the programme to be of longer duration, as there are a number of areas not covered by the first two weeks' official tour which should have a particular interest for the mining members of the mission. These include the North-East coast, South Yorkshire and Derbyshire, the Eastern counties, the London area and Cornwall, to name but five.

It has been rightly stressed that the visit of this mission should not be expected to yield immediately any very large volume of orders. Although described as a "purchasing mission," its main function will be to acquaint itself with the range of goods which we in this country can supply to Canada, and in turn to inform manufacturers here more specifically of the requirements of the Canadian market. Nevertheless, the achievement of this purpose in terms of any particular industry calls for direct consultation between members of the mission and the sales and technical personnel of British manufacturers, quite as much as would the negotiation of the sales which will doubtless subsequently develop.

In the interests of both countries it is therefore devoutly to be hoped that the formalities inseparable from the visit of a high level mission, such as that which we are about to welcome, will not be allowed to interfere unduly with the informal and personal exchange of views between manufacturer and customer without which trade cannot be promoted.

EUROPEAN COAL PRICES

Simultaneously with the announcement of a new method of classifying coal by volatile content, the European Coal and Steel Community approved a rise in coal prices. For the third time this year the price of Belgian coal is raised and the new increase is the second to be applied in France. The price of internal coal in France has been raised by 6.5 per cent and coal imported from non-pool countries will cost the French consumer 20 per cent more. This large increase in the price of imported coal results from the recent 20 per cent tax on all imported goods and is expected to have repercussions on the American coal export market, as it is the U.S. which is by far the principal supplier of foreign coal to the Continent.

It is reported from Bonn that the High Authority has started an investigation into the prices of Ruhr coal following the recent increase of coal prices by all three coal sales offices by the same amount and on the same day. These three offices control the distribution of Ruhr coal and as it is an offence under the statutes of the E.C.S.C. to form a cartel, the High Authority has decided that this coincidence warrants an investigation.

Malayan Tin Under The Microscope

IN the nine months to September 30, 1957, the Federation's mines produced 58,469 l.tons of tin concentrates compared with 62,006 l.tons in the corresponding period of 1956. The output for the whole of the year to December, 1956, was 82,620 l.tons of concentrates, a record for any year since World War II. The average assay value for calculation of tin metal content of the concentrates is also slightly lower in 1957 at 75.3 Sn against 75.4 Sn in 1956.

Delivery Statistics

Actual deliveries of tin concentrates by the producers to the smelters during the first three quarters of 1957 aggregated 59,019 l.tons, with a tin metal content of 44,442 l.tons. The Tin Export Duty collected by the Federal Government on the deliveries totalled M\$41,323,625.

For the whole of 1956 deliveries were 82,757 l.tons of concentrates with tin metal content of 62,398 l.tons upon which the Tin Export Duty collected by the Federal Government amounted to M\$59,167,590.

The current year's deliveries are equivalent to an annual rate of 78,692 l.tons of concentrates with tin metal content of 59,256 l.tons. At this rate the tin-in-concentrates figure is 3,142 l.tons below the post-war record of 1956. The figures for 1955 and 1954 were 61,726 l.tons and 60,830

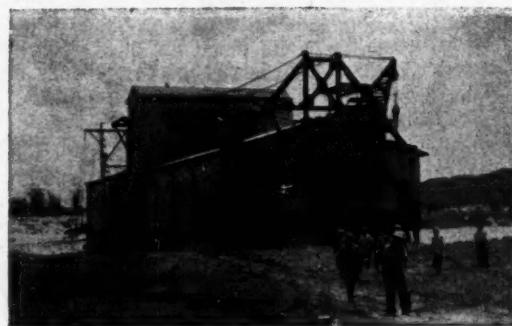
l.tons respectively. The 1957 figure is, however, higher than for any comparable period in the post-war years 1946 to 1953.

If we are to attempt to analyse the reasons for the check in the upward trend in Malaya's tin production which, except for a slight setback in 1953, has been consistently maintained since the industry resumed production following the Japanese occupation of the country, we must first look at the units of production in operation, shown below:

	1955	1956	1957		
			1st qtr.	2nd qtr.	3rd qtr.
Dredges	79	79	77	77
Gravel Pump Mines	602	636	609	597
Hydraulicking	16	14	13	13
Open cast	5	4	4	4
Underground	11	26	26	25
Miscellaneous	44	29	28	24
Total (Average)	757	788	757	740
			742		

The figures for underground mining include the several small cave workings peculiar to the State of Perlis.

The foregoing table shows that throughout 1957 the number of operating dredges has been less than in the two pre-



ceding years. The number of gravel pump mines reached a post war record of 636 in 1956. In the third quarter of 1956 there were actually 638 gravel pump mines in operation. It will be observed that the number declined in the second quarter of 1957, but recovered in the third quarter. To carry our analysis further it is necessary that we consider the changing proportions of total output achieved by the various methods of mining.

Method	1955	1956	1957		
	%	%	1st qtr.	2nd qtr.	3rd qtr.
Dredging ..	50.69	49.29	47.42	46.86	47.74
Gravel Pumping ..	39.18	40.03	40.81	41.40	42.15
Hydraulicking ..	2.20	2.36	2.83	2.64	2.67
Open Cast ..	2.01	2.20	2.27	1.98	1.81
Underground ..	3.66	3.85	4.35	4.81	3.67
Others ..	0.48	0.50	0.45	0.39	0.51
Dulang (Pan) Washing ..	1.78	1.77	1.87	1.92	1.75

A feature of the above table is the upward trend in the production by gravel pump mines, a trend which was main-

Opposite : The Malay Peninsula, showing the position of the Kuala Selangor and Rasa areas

Centre : A tin dredge owned by Sungai Way Dredging Ltd.

Above : The pump house of a Malayan tin mine.

tained in the third quarter of the current year in spite of an upward turn in the ratio curve of dredging.

The number of operating gravel pumps dropped in the first quarter and further decreased in the second quarter but new installations came into production in the latter quarter. In spite of these fluctuations in units, the ratio of production by this method maintained a steady upward trend.

Although dredging continues to be the most productive method of tin mining the gap between the ratio of production by dredging and that by gravel-pumping tended to



narrow, until the third quarter of the current year, when the dredging ratio took an upward turn. It may be anticipated that the recovery will be maintained in the final quarter of 1957. During September an additional dredge commenced working in Perak and another dredge in Selangor will shortly come into full production. Against this a smaller dredge in Perak is scheduled to cease operating before the end of the year.

In attempting to assess the prospects for the final quarter of 1957 the market price of tin is undoubtedly a factor. Hereunder is a table of the average prices on the Singapore Tin Market :

	MS per picul
Year to 31 December, 1955	365.50
Year to 31 December, 1956	387.03
1957	
January	384.92½
February	379.34
March	381.07
April	387.60
May	385.87½
June	383.10
July	376.57
August	369.45
September	366.40

During the first three weeks of October the price fell from MS364.00 per picul (133½ lb.) to MS355.25½. In the absence of any major political crisis there is little probability of any material improvement in the price until after the year-end. The operation of the Buffer Stock Pool may steady the market, but no information is yet available regarding the extent to which buying on that account has been made.

So far as Malayan producers are concerned, the falling price of tin has caused some small miners working marginal land to cease production. These miners had found that the levy of MS24 per picul of tin concentrates which they have had to pay to government on all concentrates won since October, 1956, in contribution to Malaya's share of the Buffer Stock Fund, coupled with the falling tin price, was too much for them. The contributions ceased on October 14, 1957, on the first instalment to the

The Mines Department of the Federation of Malaya has released statistics for the third quarter of 1957. Comparison of the figures with those for the preceding two quarters and for the year 1956 discloses that the increasing trend in tin production, which attained a post-war record in 1956, has received at least a temporary check, writes our correspondent in the Federation. Malaya being the world's leading producer of tin, any material change in the production trend is of great importance not only to tin consumers throughout the world, but also to the economy of the Federation of Malaya, which obtains a large proportion of its federal revenues from a duty on tin exports.

Buffer Stock being fully repaid by the miners to the government. It may be that, freed from levy contributions, some of these small producers will return.

The National Land Policy

The dredging companies and the larger gravel pump operators are looking to the Federal Government's new National Land Policy to provide them with a more hospitable attitude towards the mining industry's admittedly urgent need for new land to replace land about to be exhausted, and to speed up the granting of new leases when suitable land for opening up has been found by prospecting. The great improvement in the emergency situation will undoubtedly free for prospecting large areas previously closed to prospectors. The immediate situation regarding land available for mining does not indicate that much increase in production above the present rate can be expected. A more enlightened government policy regarding land alienation to mining, promised by H.M. the Yang Di-Pertuan Agong in his speech to the Federal Legislative Council shortly after the country achieved its independence, will undoubtedly revitalise the industry and installations now on care and maintenance will again come into production. The long-term view is favourable provided the world situation does not necessitate the bringing into force of restrictions on output under the provisions of the International Tin Agreement.

Mr. Ian Patterson, on the eve of his retirement from the post of Chief Inspector of Mines earlier in the year, declared that there was more tin left in the Federation than had ever been taken out.

The production of iron ore continues to expand, with by far the greater portion continuing to be shipped to Japan. Some smaller shipments have gone to Taiwan. Japan is also Malaya's best customer for bauxite.

The following table shows the production of minerals other than tin :

Mineral	1957				
	1955 Tons	1956 Tons	1st qtr. Tons	2nd qtr. Tons	3rd qtr. Tons
Coal ..	206,118	182,479	51,605	40,392	21,410
Wolfram ..	56	48	10	7	5
Scheelite ..	50	46	8	3	2
Iron-Ore ..	1,466,184	2,444,570	669,792	832,888	936,399
Ilmenite (exports)	53,875	122,176	15,396	38,646	12,287
China Clay ..	1,378	1,155	368	384	359
Columbite ..	236	277	47	32	33
Bauxite ..	222,162	264,444	73,124	76,344	85,795
Monazite (exports)	N.A.	631	183	72	189
	Troy oz.	Troy oz.	Troy oz.	Troy oz.	Troy oz.
Gold ..	22,838	20,252	2,312	1,519	3,730



The Mining Journal—November 22, 1957

CAM AND MOTOR—III

A panoramic view of the Cam and Motor Mine, Southern Rhodesia's largest gold producer

METALLURGICAL PRACTICE AT THE CAM AND MOTOR

This article concludes the series of three dealing with operations at the Cam and Motor mine, Southern Rhodesia. The ore is refractory to cyanide treatment and requires roasting. The plant treats 800 tons of ore per day

DUUE to the presence of antimony and arsenic occurring as stibnite and arsenopyrite, the ore is refractory to cyanide treatment and requires roasting. The plant treats 800 tons of mine ore per day, all of which is hauled by skips in the Main Shaft.

Due to the refractory nature of the ore the process is concentration of the sulphides and free gold with the rejection of the concentration tailings as a final residue. Re-concentration of gravity concentrates gives a high grade product containing the free gold for barrel amalgamation recovery, and all concentrates pass to the Edwards Roasters for oxidation or volatilization of the arsenopyrite, stibnite and pyrite. Normal cyanide treatment of the roasted concentrates completes the process.

There are three stages of concentration, primary and secondary on tables, followed by a tertiary stage which is now flotation of the classifier overflow product.

Concentration Processes

A primary gravity concentrate is made on 17 Record tables directly in the 56 Nissen Stamps discharge. Tailings from these tables are pumped to the Dorr classifiers, the overflow going direct to the thickeners.

The rake product feeds the 6 tube mills which discharge to a further 19 secondary Record tables in closed circuit with the classifiers.

Both primary and secondary gravity concentrates pass to three reconcentrating Record tables which pull a high grade cut containing the free gold in a heavy arsenopyrite stibnite concentrate. To obviate sickening of the mercury the concentrate is given a 24-hour roast in a small roaster ahead of the amalgamation barrel. A daily barrel charge of this roast, cleared up next day, gives the gold recovery by amalgamation. This recovery is approximately 65 per cent of total recovery.

The overflow concentrates from the above tables pass to a further four Record tables. These are set to control the feed grade and amount of gangue in the gravity concentrates going to the Edwards roasters. Tailings from these four tables are returned direct to the tube mill closed circuit. The concentrates are fed to a dewatering Dorr classifier, the rake product discharging on to the top of an Oliver filter-drum where it joins the filtered flotation concentrate cake. Both products are mixed in a screw conveyor which feeds the roaster bins by conveyor belt.

The classifier overflow is thickened and is fed to the Galigher Flotation plant at roughly 66 per cent moisture, and grading about 75 to 80 per cent minus 200 mesh.

Conditioning time is approximately 20 minutes, the pulp being fed to the 5th cell of a straight bank of 30 Galigher No. 36 Agitair cells, passing straight through 26 cells and discharging as final flotation tailing. All concentrates made to cell 22 (being 18 middling cells) are returned to the head of the machine where the first four cells act as cleaners. These deliver the final flotation concentrate via a thickener to the Oliver filter mentioned above, their underflow joining the main pulp stream in the 5th cell.

The last 8 cells are used as scavengers, all the concentrate being returned to the head of the conditioner circuit.

Reagents normally used are: Copper sulphate, 0.25 lb. per ton, fed to thickener underflow; pine oil, 0.06 lb. per ton, fed to 1st conditioner; xanthate 301, 0.10 lb. per ton, fed to 1st conditioner; xanthate Z6, 0.05 lb. per ton, fed to 1st conditioner; dowfroth 250, 0.006 lb. per ton, fed to 4th conditioner. Usual Ph value 8.2.

When necessary some Xanthate 301 and Z6 is added half way down the middling cells. The final tailing to the slimes dam averages 0.5 dwts. Approximately 17 tons of flotation concentrate per day at around 60 dwts. is sent to the Oliver filter for roasters. The Galigher flotation plant was started up in April, 1954.

In the past there has been considerable variation in the treatment of the classifier overflow product to make a tertiary concentrate. Satisfactory flotation recoveries were made in the early days but the concentrate produced was finely divided and contained much antimony. When mixed with gravity concentrates a poor roast was obtained, resulting in high cyanide residues.

During 1953 flotation tests indicated that modern flotation reagents and improvements in practice would give a lower final tailing and a flotation concentrate that was suitable for roasting, should a really good mix with the primary and secondary gravity concentrate be obtained. Accordingly a pilot flotation plant was brought into use in place of the James slimes tables and the concentration tailing decreased roughly 0.6 dwts. to a value of 0.7 dwts. The pilot-plant capacity was well below requirements and it was decided to install the present 30 Galigher cells. These gave a further improvement in the residue value of about 0.2 dwts. to 0.5 dwts. per ton.

An intimate mix of the comparatively coarse gravity primary and secondary, and very fine sticky tertiary flotation concentrates, is made at the Oliver filter. This is in continuous operation picking up the flotation concentrate cake in the normal manner. Meanwhile the Dorr rake classifier regularly discharges the gravity concentrates on top of this. All concentrates are discharged together into the screw conveyor which forces an intimate mix giving a satisfactory product for the roasters.

The arrangement is unusual, but it has certainly obviated small chunks of straight flotation cake entering the roasters. Where this has happened elsewhere small prills of flotation concentrate have formed in the roaster up to $\frac{1}{2}$ in. in dia., and these have discharged roasted on the outside but green inside. With antimony present this is looking for trouble in the cyanide plant.

In a stamp and tube mill circuit the soft stibnite tends to slime and be washed off gravity tables, but it is recovered in finely divided state in the flotation concentrates. Consequently it can be appreciated how useful the coarse primary concentrate is in assisting a proper roast.

There are five 56-rabble Edwards Duplex Roasters with water-cooled rabbles. Ferro-chrome dry rabbles are at present on trial in an attempt to eliminate water-cooling.

The roasters are fired by mechanical stokers feeding pea coal. A slow increase in heat until the antimony has volatilized is ideal, after which the temperature rises to around 700 deg. C. so that oxidation is complete. The roast cools off in the final stages through the roaster, discharges into the push conveyor and passes to the roaster discharge bin. Checked on a weightometer belt, the roasted concentrates are pulped with water in a vortex mixer and pumped to the cyanide plant.

The Cyanide Plant

The cyanide plant is capable of handling up to 100 tons of roasted concentrates per day, and at present treats about 80 tons. The pulp from the roasters is pumped to an 18 in. cyclone, the underflow of which feeds the Dorr rake classifier. Both overflow products pass to a 50 ft. thickener, the overflow water removing any soluble salts which may have formed in the roaster.

Classifier rake product is ground in a 10 ft. 3 in. x 5 ft. 6 in. ball mill, with concentration on a mechanical blanket strake and reconcentration on a James table for barrel recovery of amalgamable gold freed during roasting. After concentration the ball mill discharge returns to the cyclone and classifier.

A usual grading of the feed to the cyanide plant is + 90 42.0 per cent + 200 18.0 per cent - 200 40.0 per cent.

The final grading for cyanidation is + 200 1.0 per cent + 325 10.0 per cent - 325 89.0 per cent.

The thickener underflow has a final water wash on No. 1 Oliver filter, the cake is repulped with cyanide solution and pumped to 6 pachucas 40 x 12 ft., where it is agitated at about 75 per cent solution, and discharged to the two thickeners which overflow pregnant solution to the clarifiers. Thickener underflow receives a final wash on No 2 Oliver filter, the repulped cake being pumped to the residue dam. The filtrate goes to the clarifiers and precipitation takes place in a standard Crowe Merrill plant handling around 450 tons of solution per day.

Cyanide strength in the pachucas is normally 0.24 per cent K.C.N. and alkalinity 0.036 per cent CaO.

Normal consumption of reagents in the plant is: cyanide, 6 lb. per ton treated; lime, 20 lb. per ton treated; lead nitrate, 2 lb. per ton treated and zinc dust, 0.06 lb. per ton of solution.

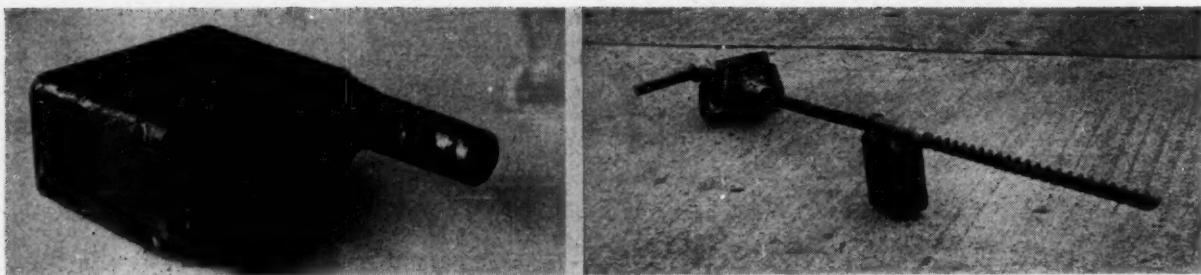
The satisfactory flotation results on current ore, and laboratory tests on the old slimes dam, suggested that an economic flotation recovery on this material could be made. The pilot plant mentioned above was available, so it was arranged to hydraulic some of the slimes as a plant test. Results were encouraging, so the 7 x 56 in. Fagergren cell plant was extended to 13 cells.

For the last nine months about 800 tons a day have been treated giving roughly 0.6 dwts. recovery and a similar tailing. Concentrates averaging 70 dwts. have joined the current treatment flotation concentrates for feed to the roasters.

Reagents normally used are: pine oil, 0.03 lb. per ton, fed to conditioner; xanthate 301, 0.03 lb. per ton, fed to conditioner; xanthate Z6, 0.01 lb. per ton, fed to 3rd cell.

An interesting point is that copper sulphate, essential to flotation of newly-ground sulphide in the main plant, is not used. In fact its use has proved detrimental to flotation of the tarnished sulphides in the old slimes dam.

Further flotation plant to increase retreatment of the slimes dam by 1,600 tons per day is now being installed.



REPORTS of interesting developments within the British coal mining industry continue to be received, many of which are the outcome of the experience of employees of the industry, while others are the product of technical advances promoted by manufacturing organizations.

The Poulson dust trap has been designed in Durham, to trap and collect the dust made when drilling coal or stone shotholes with power-driven drilling machines of any type. The trap consists essentially of a steel box designed to ride upon the drill rod, and with a sliding door attachment in the base of the box through which the dust can be extracted.

In using the device, the driller starts his hole to a depth of about 2 in. The drill rod is then placed with the bit in the hole and the box passed along the rod and firmly pushed into the hole. The drilling machine is then connected to

equipment for the two A.C. winders to be employed. One equipment, which has been in operation since September, 1955, is rated at 1,500 h.p. The other equipment, which is due to be installed this year, is rated at 1,150 h.p.

The winders utilize four-deck cages, two per winder, the four cages being accommodated side by side in a 21 ft. 7 in. dia. shaft. An "A" frame headgear of novel design is used for the winders, which are fitted with balance ropes. The winder motors drive 18-ft. dia. by 7-ft. 6½-in. wide parallel drums through single-reduction gearing. Electrical supply is at 3,300 v., 3-phase, 50 cycles, and the winders are designed to lift a coal load of 10 tons per trip. The suspended load on the loaded-cage side carried by the 24-in. dia. locked coil rope at present in use, is 32 tons when winding to the 1,450 ft. level.

The speed control of these winders is based on the closed-loop principle, speed being related to the position of the

British Coal Mining Developments

the rod and drilling proceeds. The drillings are conveyed along the rifling of the drill rod to the dust box, which can be removed and emptied as required, and can be designed to contain the drillings from one hole or one rod.

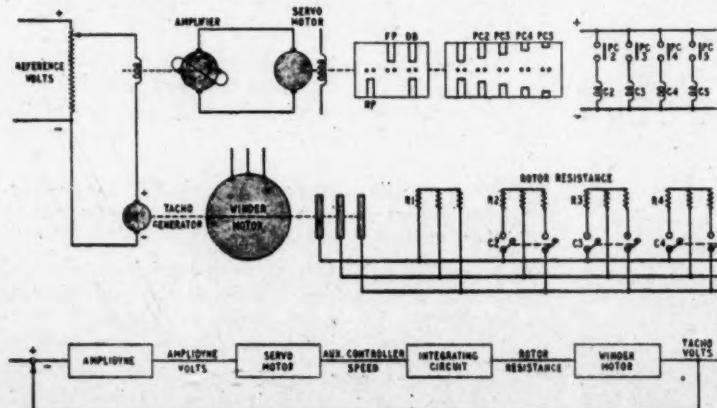
The British Thomson-Houston Co. Ltd. is participating to the fullest extent in the reorganization programme being carried out by the N.C.B. In the Scottish Division several major development projects are nearing completion. One of these is at Barony Colliery in Ayrshire, in the East Ayr Area of the Scottish Division of the National Coal Board.

Barony Colliery is not a new colliery, Nos. 1 and 2 shafts having been in operation for many years. A new shaft, No. 3, has been sunk over 2,000 ft. to mine estimated coal reserves of 120,000,000 tons at the rate of 4,000 tons per day. For this shaft BTB is supplying, as sub-contractors to Fullerton Hodgart and Barclay, Ltd., the electrical

driver's lever irrespective of the magnitude or direction of the load. The speed control is interesting in that A.C. induction motors with rotor contactor control and forced-ventilated resistances have been used, and the 1,500 h.p. winder is the first winder of its type to go into operation anywhere in the world.

The driver selects the direction and speed by moving his control lever, the steady speed selected being directly related to the position of the lever.

If the load is overhauling, dynamic braking is automatically applied and regulated. It is interesting to record that the D.C. excitation is provided via a 20/120-kVA power magnestat, which is believed to be the largest self-saturating reactor yet manufactured. This magnestat feeds an oil-immersed, selenium rectifier, making the entire dynamic braking equipment completely static.



Above is illustrated the Poulson Dust Trap. At left, the unit is shown detached and at right, incorporated with the face drill. Alongside is a theoretical diagram of the closed-loop control system employed at Barony Colliery

Technical Briefs

New Continuous Sulphur Removal Process

Research on desulphurization of iron for Diamond Alkali Co., Cleveland, major producer of basic industrial chemicals, has resulted in the development of a new, continuous sulphur-removal process by the Battelle Institute, U.S.

In the new process molten iron and caustic soda are fed continuously into an apparatus where desulphurization occurs as the materials are intermixed. Desulphurized metals and caustic slag flow continuously from the apparatus into moulds or ladles. Introduction of a jet of oxygen into the mixing chamber makes it possible to remove substantial amounts of silicon at the same time the sulphur content is being reduced.

Under laboratory conditions the new process has been used to achieve 90 per cent reductions in sulphur content, according to reports. Because of the low final sulphur content, the process holds promise for use in the production of ductile cast-iron as well as in the desulphurization of pig-iron prior to conversion into steel.

Desulphurization occurs rapidly because thin layers of reacting materials are used. Samples taken during heats at Battelle's pilot-plant laboratory show that the sulphur-removal reactions after addition of the caustic soda require less than a minute for completion. Thus large quantities of iron can be treated in a unit requiring relatively small space.

Because of the long-time trend towards higher sulphur contents both in coke and in iron ore, an economic method for the removal of sulphur from iron is a matter of considerable technical importance to foundries and steel mills. Some desulphurization is already being practised to maintain quality in certain iron and steel production.

PROTECTION OF MOLYBDENUM

The lack of resistance to oxidation characteristic of molybdenum at temperatures above about 540 deg. C. is a major obstacle hindering the full utilization of the mechanical properties of this metal, which would otherwise render it outstandingly suitable for high-temperature service. The nature of the attack, and means for preventing it, have already been the subject of intensive study in several countries.

The requirements which must be met by any coating which will form a surface barrier and thus inhibit oxidation are listed as resistance to oxidation, thermal shock, impact, erosion and fatigue, and an adequate degree of ductility at working temperatures.

A recent review is devoted mainly to a consideration of the methods which have been proposed for prevention of oxidation. The effects producible and the degree of protection afforded are discussed in relation to the use of self-regenerative scales, e.g., molybdates formed by oxidation of nickel or cobalt-molybdenum alloys, and coatings on molybdenum-base materials (e.g., coatings of ceramic materials, of molyb-

denum disilicide, metallic coatings deposited by cladding, spraying or electroplating, diffusion coatings, and chromizing).

The information available shows that the major stumbling-block to the use of some of the methods which would prevent oxidation lies in the difficulty of securing adequate resistance to high-velocity impact.

It is concluded that the most successful coating compositions yet developed centre on the nickel-chromium alloy system. Both electroplated chromium-nickel layers and sprayed nickel-chromium alloys containing silicon and boron have shown the ability to protect molybdenum up to about 1,090 deg. C., and sprayed mixed-silicide layers also appear promising. The suitability of such protective methods should be determined by engine tests. Of the systems so far examined, only ceramic and molybdenum-silicide coatings offer promise for use at still higher temperatures.

NEW MAGNETIC MATERIAL

The General Electric Co., U.S., has developed a new magnetic material which it claims will increase efficiency and cut the noise of electrical equipment. The company said the product—doubly oriented silicon iron—had been a research goal for 20 years, and was only in pilot production. It said it did not know when the material would be commercially available. Eventually it will be used for cores of transformers, generators and motors.

Cores currently are made of singly oriented materials, magnetized in two directions. Changes in the direction of magnetization produce friction, which causes loss of energy and noise. The new material, the company states, could be magnetized in four directions, providing for easier movement of magnetic lines of force.

WELDING FOR NUCLEAR ENERGY

The welding of large vessels with walls of very thick plate for nuclear energy applications and other large industrial fabrications presents a number of problems.

It is of the greatest importance to obtain good and uniform physical properties throughout the whole section of the welded joint in such applications and this difficult welding problem has recently been solved after research at the Murex Research Laboratories by the development of a new electrode known as Fortrex 35A.

For the successful welding of extra-thick plate an electrode must not only give the required physical properties in the weld metal, but it is essential for it to be capable of use in all positions and possess the usual characteristics of easy slag removal and manipulation normally associated with deep groove welding. The radiographic quality of the weld metal must also be good.

Another very important point relates to the physical properties of the welded joint at sub-zero temperatures. Large vessels for nuclear energy applications, and certain other industrial purposes, are normally constructed in the open on exposed sites and work on them has to continue throughout the winter months. Although precautions such as preheating are adopted, experience has shown that it is essential to reduce the risk of brittle fracture to a minimum by specifying that such vessels must be welded with material which has high impact properties at sub-zero temperatures throughout the full thickness of the welded joint.

Plates up to $1\frac{1}{2}$ in. in thickness can be successfully welded by using the normal low hydrogen electrodes of the Fortrex 35 type and satisfactory tensile, elongation and impact properties can be obtained throughout the full thickness of the weld. However, standard electrodes have not been found entirely satisfactory when used for the welding of vessels with 3 in. to 4 in. thick walls. Extensive investigations have shown that although all other physical properties have remained satisfactory, charpy impact results at sub-zero temperatures have shown a very wide scatter range and have not always been up to the required standard throughout the full thickness of the weld.

This fact led to the development of the new Murex Fortrex 35A. Research work involved the testing of a large number of 3 in. to 4 in. thick plates over a period of many months and about 1,000 charpy V-notch test-pieces were machined from the welds made in these thick plates in all the positions which are encountered in the welding of large spherical or cylindrical vessels.

The new Fortrex 35A electrode gives all the required properties in the welded joint in extra-thick plates and the weld metal has particularly good impact properties at sub-zero temperatures. The electrode also has all the advantages of the standard Fortrex 35 type. It is an all-position electrode; it is simple to use, slag removal is easy, and the radiographic quality of the weld metal is sound.

UNUSUAL ROOF TESTS

An unusual test in which a large roof area in an underground limestone mine in Ohio was left unsupported while U.S. Bureau of Mines research operators studied the movement of rock over a period of many months has added to the Bureau's knowledge of mine safety. The Bureau plans follow-up experiments in various mines to aid industry further and to promote safety for workers.

The site of the Ohio research was a room created especially in the Jonathan limestone mine near Zanesville. Started originally as a room 10 ft. wide by 100 ft. long, the area was enlarged to become a cavern 40 ft. by 100 ft. Special instruments were installed by the Bureau to measure rock movements. The study gives assurance that the size of mine roof can be designed by scientific methods.

Machinery and Equipment

Aluminium Increases Payload

Since adequate supplies of aluminium are now available in most countries, world markets for the metal are likely to become increasingly competitive. This point has been made on many occasions in *The Mining Journal*, as has the fact that entrance to fresh markets where lightness provides bargaining power will prove of inestimable value to producers.

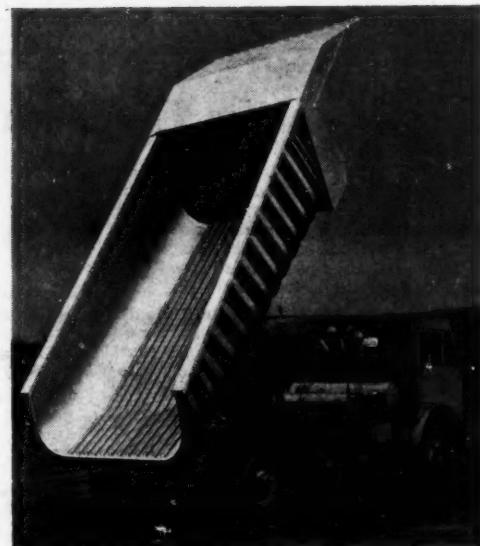
With aluminium now being used as a structural material in many widely differing industries, it is of interest to report that a new 10 cu. yd. capacity ultra-heavy duty aluminium alloy dumper body, constructed by G. E. Neville and Sons, Ltd., for Fodens, Ltd., and now on demonstration trials, is probably the most robust ever constructed in this material. The use of aluminium has cut the weight of the body to half that of the normal steel type and has enabled its carrying capacity to be increased by over 10 per cent.

The body was designed in co-operation with Northern Aluminium Co., Ltd., who also supplied the aluminium, and is basically constructed of extruded planks in Noral B51SWP alloy, formed through two 90 deg. bends at 16 in. radius to a "U" shape. These planks form the floor, sides and framing of the body, and are assembled one to another by bolts passing through the front and rear flanges. The body is reinforced, externally, by the addition of extruded channels, or "top-hat" sections, also in Noral B51SWP, which conform to its outer shape and are bolted to the stiffening ribs of the plank section. Internally, there is a lining of Noral 26SWP plate, $\frac{1}{4}$ in. thick. Further protection is afforded by impact strips.

In order to relieve the chassis as much as possible from impact loads, the steel body sub-frame is carried on twelve Metalastik rubber buffers. A full 60 deg. angle of tip is obtained.

This body weighs 2 tons 4 cwt., about half that of its steel equivalent, and gives

An ultra-heavy duty dumper body constructed of Noral aluminium alloys

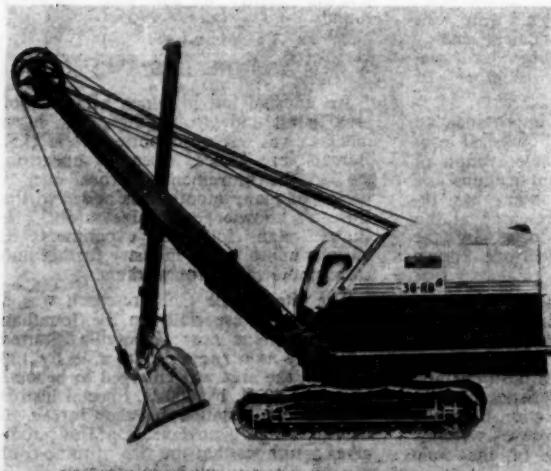


a yard more capacity; on this basis nine chassis with aluminium bodies could do the work of ten with steel bodies, and the resultant cost saving would more than offset the increased cost of an aluminium body over a steel one.

A UNIVERSAL EXCAVATOR

The new Ruston-Bucyrus 30-RB excavator with full air control has a capacity of 1 cu. yd. with shovel equipment, and additional equipments available are dragline, drag-shovel, grabbing crane, and lifting crane. A prototype, exhibited at the Public Works Exhibition in London last year, was described briefly in our issue of November 9, 1956.

In the design of the 30-RB is embodied experience in the development and manufacture of modern machines of this type, examples of which are the 10-RB, 19-RB, 22-RB and 38-RB. The best features of these units have been incorporated in the new model. In addition, a number of innovations have been introduced, including the major one of full air control for the main functions.



The Ruston-Bucyrus 30-RB excavator with shovel attachment

It is considered that the introduction of air control represents an appreciable step towards meeting the present-day requirements of owners and operators.

Air controls are used for main operations, while graduated type air controls are used for those functions where "feel" of engagement is vital to good working. There is a direct power flow to operating parts; power being provided by a Ruston 5-cylinder diesel developing 96.8 h.p. at 1,200 r.p.m.

In so far as the front end equipments are concerned, the shovel's crowd rope drum concentric with boom foot pins enables changes in boom angle without the adjustment of ropes and permits speedy conversion of the front-end equipment. The drag-shovel has a cambered boom, while a new design of dipper is available in various widths.

In the dragline, grabbing and lifting cranes, the booms are up to 100 ft. in length with jibs of 10 ft., 20 ft., or 30 ft. length. The boom hoist is independent.

DENSE MEDIA SEPARATION

Since the starting of the first Neldco coal-washing plant about ten years ago, progress has been steady throughout the world, and now more than 70 Neldco plants in five countries are washing 15,000 tons of coal an hour.

The process is claimed as the simplest of all coal-cleaning systems. Initial and operating costs are said to be lower and magnetic consumption is seldom more than $\frac{1}{2}$ lb. per ton of feed. Neldco plants make a separation close to theoretical at any density between 1.25 and 2.0.

The plants are compact, a unit to treat 250 T/hr. occupies a space 31 ft. by 17 ft. with 27 ft. headroom. All operating controls are located on a single floor and one operator is sufficient.

Neldco uses three types of separating vessel, but for normal coal cleaning the submerged feed processor is most popular. Neldco coal-washing plants are built in the United Kingdom by Blantyre Engineering Co., Ltd.

MINING MISCELLANY

A new deposit of mercury ore has been found near Torrejoncillo in Caceres Province, Spain. *

A committee of German experts is to arrive shortly in Greece to study the requirements necessary for the establishment of an aluminium industry in the country. *

An estimate that tin reserves in Southern Rhodesia may exceed 2,000,000 tons has been made by the Hon. C. J. Hatty, Minister of Mines. *

The claims of the National Union of Mineworkers for the reduction of surface workers' hours from 42½ to 40 a week, and for a sickness agreement, were presented at a meeting of the Joint National Negotiating Committee last week. *

In a contract signed recently between the Government of Portugal and N. V. Billiton Maatschappij, Billiton will have the right to explore for aluminium-bearing minerals in certain specified areas of Angola and Portuguese Guinea. *

The British Aluminium Company expects to begin production in its Baie Comeau Plant, Quebec, early in December. The first stage of development has been completed and the second stage is scheduled for completion in 1958. Eventually, some three thousand workers will be employed. *

Saguenay Terminals Ltd., a subsidiary of the Aluminium Company of Canada has taken delivery of an 8,750-ton bauxite carrier from the Oraga Dock Company which has a further order in hand from Alcan's subsidiary for a 15,750-ton carrier. *

Between Gilgit and Chitral in West Pakistan deposits of lead ore covering an area of some 200 acres have been discovered recently. According to an official of the Mineral Department the deposits could be exploited commercially. *

A Cuba Government decree grants a port concession at Santa Lucia to the Mora Mining Co. for handling of barite shipments from deposits in the Pinar del Rio province. The Mora Co. is drilling to determine the size of the deposits, estimated at 500,000 t.ons. *

The St. Lawrence Corporation, a fluor-spar mining company at St. Lawrence on the south coast, suspended operations recently. A contract between the company and the United States Government expired early this year, and the company had sought alternative markets in the United States since that time. *

Stewarts and Lloyds Minerals, Ltd., are developing the first stages of a large underground ironstone mine in the Thistleton area, Rutland. In the initial stages, an annual output of 100,000 tons is planned, but it is likely that this will be increased to 400,000 tons within a few years. Ultimately, if required, this output could be doubled. *

The Polish Minister of Mining and the Power Industry, Mr. F. Waniolka, has

given details of the Five-Year Plan as it will affect Poland's coal industry. The basic task is the achievement of 105,000,000 tons in 1960. Some 30 per cent of this total will be won from Silesia. Planned capacity of all shallow mines will amount to 15,500 tons per day by 1960, while brown coal production should increase to 11,000,000 tons per year, or twice as much as in 1955. *

Some 350,000 tons of coal, over twice the tonnage recorded in October, will be loaded in Gdansk and Gdynia, Poland, during November. Coal ships will travel to twelve countries. Trial deliveries will be shipped to Greece, Egypt and Pakistan. *

It is reported that Belcher Mining Corporation is currently negotiating a big iron ore deal with European interests in respect of a deposit on the mainland of northern Quebec. The deposit was not hitherto disclosed as being among the Belcher assets. At the same time, a spokesman of Sweden's Grangesberg company has stated that negotiations are proceeding in respect of Belcher's mainland deposit. Hitherto, Belcher's prospects have been almost wholly identified with the 1,000,000,000 tons of iron ore indicated by drilling on the Belcher Islands in Hudson Bay. The information has now been received that, apart from the main deposits on the islands, Belcher has also made the discovery of what is described as "virtually a mountain" of iron ore at Great Whale Bay. This site lies west of the Hollinger deposits at Knob Lake. *

The World Bank is expected to announce a \$32,500,000 loan to an Indian steel company, with nine North American private banks participating in the financing. The Indian firm is the Tata Iron and Steel Co., which the World Bank in June last year lent \$75,000,000 as initial aid towards the company's Five-Year Expansion Programme. One of the most significant features of the loan would be the contribution of about \$15,000,000 by nine private banks in the United States and Canada. This would be the first time that any private banks in North America had joined the World Bank in assisting free enterprise projects in India. Over the five-year period, Tata is expected to need total investment equivalent to about \$250,000,000. *

Britain has sent a team to Russia to see the work that has been done on underground gasification of coal in the Soviet Union. The party will consist of representatives of the National Coal Board; the contractors responsible under the Board for the pilot scheme at Newman Spinney, near Chesterfield; and the consultants for the project. The party left the United Kingdom on November 17 to spend about two weeks in the Soviet Union, and next March a party of Russian experts will visit this country. The British team consists of Mr. J. Norval, chairman, Underground Gasification Executive, National Coal Board; Mr. W. M. Noble, deputy production director, East Midlands Division, N.C.B.; Dr. A. E. Balfour, deputy head of Underground Gasification, Humphreys

and Glasgow, Ltd., contractors for the Newman Spinney project; Mr. J. H. Lander, partner of Sir Alexander Gibb and Partners, the N.C.B.'s consultants for the Newman Spinney contract; and Mr. F. E. Warner, of Cremer and Warner, consulting chemical engineers, also consultants on the Newman Spinney contract. *

PERSONAL

Her Majesty the Queen Mother honoured the Rhodesia and Nyasaland Club with her presence at a reception held on Tuesday evening at Goldsmiths' Hall. The company included the Earl and Countess De La Warr, the High Commissioner for the Union of South Africa and Mrs. Holloway, the Secretary of State for Commonwealth Relations, Sir Ronald and Lady Prain, Mr. E. D. Hawksley, honorary secretary, and Mrs. Hawksley. *

Mr. W. S. Findlay has joined the board of the Consolidated Murchison (Transvaal) Goldfields and Development Co. in place of Mr. K. Richardson, who has resigned. *

Mr. D. B. Price has been appointed resident representative in Africa for Priestman Bros., Ltd. *

Sir Ben Lockspeiser, head of the European Organization for Atomic Research, has accepted the post of senior adviser to the Technological Advisory Council of the Israel Ministry of Development. *

Mr. H. P. Potts, M.I.Mech.E., has joined the Board of Directors of The Colchester Machinery Corporation Ltd., of Toronto, Montreal and Vancouver, which is associated with the Colchester Lathe Company Ltd. of Colchester, Essex. Both are members of the 600 Group of Companies.

CONFERENCES AND EXHIBITIONS

On December 12 the N.C.B. will show two films at the British Council Theatre, Hanover St., London, W.1. The films are entitled "Watch that trailing cable" and "Sinking the shaft at Bevercotes new Mine" (Part 2). *

Over 140 guests recently attended a film show at Scunthorpe given by H. Leverton and Co., Ltd., Spalding, the Caterpillar dealers. The show was planned to introduce new Caterpillar equipment to customers and prospective customers from the steel plants and various contractors in the area. *

The following dates of forthcoming meetings have been announced: Manchester Geological and Mining Society, Wigan, December 12, 1957; the Midland Counties Institution of Engineers, Nottingham, December 11, 1957; the Midland Institute of Mining Engineers, Doncaster, December 12, 1957, and Sheffield, January 2, 1958; the North of England Institute of Mining and Mecha-

nical Engineers, Newcastle upon Tyne, December 7, 1957; the North Staffordshire Institute of Mining Engineers, Stoke-on-Trent, December 9, 1957; the South Staffordshire and Warwickshire Institute of Mining Engineers, Tamworth, December 13, 1957; the South Wales Institute of Engineers, Cardiff, December 12, 1957.

COMPANY EVENTS

Work has started on a £6,000,000 expansion scheme at British Petroleum's Grangemouth refinery, designed to increase the processing capacity from 2,200,000 to 3,100,000 tons a year.

The managing board of Cie Minière de l'Ogooué (COMILOG), the company which mines the French Gabon manganese deposit and in which the U.S. Steel Co. holds a 49 per cent participation, decided on November 12 to increase the company's capital from the present 150 million African francs to 2,500 millions. The funds will be used to step

up manganese production in the Franceville deposit.

Crucible Steel Co. of America has acquired full ownership of Rem-Cru Titanium, Inc., formerly held jointly by Crucible and Remington Arms Co.

The directors of Sandvikens Jernverke, Sweden, propose to increase the company's joint capital to 80 million crowns from 60 million by the issue of 200,000 100-kronor shares. The issue price will be 120 kronor per share. The increased capital is mainly intended for the expansion of tungsten carbide production at the company's Västberga factory, near Stockholm.

Signing of a \$10,000,000 contract for construction of a uranium processing mill near Grants, N.M., has been announced by the U.S. producer, Homestake Mining Co. Ores from Homestake-Sapin properties and from other producers in the area will be processed by the mill, which will have a daily capacity of 1,500 tons.

CONTRACTS AND TENDERS

The International Co-operation Administration has announced the following procurements.

South Africa

Ten 1451/57. One mobile air compressor delivering 120 c.f.m., diesel driven. Four rock drills, 55 lb. dry type, $\frac{1}{4}$ in. chuck. Six lengths heavy-duty mining hose (50 ft.) and accessories. Various drill rods and bits. Closing date: 6/12/57. Issuing authority: S.W. Africa Tender Board. Ref. E.S.B. 27650/57. Telephone Chancery 4411, extension 738 or 771.

Taiwan (Formosa)

Project Implementation Order 84-21-007-9-70248. 500 sets of three links of chain coupling for mine cars. Dimensions, breaking strength, etc., listed. Issuing authority: Central Trust of China, Purchasing Dept., 68 Yen Ping Nan Road, Taipei, Taiwan. Closing date: 17/12/57. Ref. E.S.B. 27671/57. Telephone Chancery 4411, extension 354.

South Africa

One heavy-duty diesel-driven crawler-mounted full-revolving dragline excavator, 30 ft. boom, 10 ft. extension section; bucket, $\frac{1}{2}$ cu. yd.; 62 b.h.p. at 1,200 r.p.m. Issuing authority: Stores Dept., S.A. Railways. Closing date: 13/12/57. Ref. E.S.B. 27755/57. Telephone Chancery 4411, extension 738 or 771.

South Africa

14,000 lb. copper wire, No. 10 S.W.G. To specifications. Ten C2500. South African Railways, P.O. Box 8617, Johannesburg. Closing date: 18/12/57. Ref. E.S.B. 27674/57. Telephone Chancery 4411, extension 738 or 771.

British East Africa

Pump sets and ancillary equipment. Ten, P.S. No. 4. Closing date: 6/12/57. Communicate Town Clerk, Dar-es-Salaam. Ref. E.S.B. 27824/57. Telephone Chancery 4411, extension 738 or 771.

Cambodia

Five pumps, centrifugal, 5 in. suction and 4 in. discharge. Minimum capacity, 450 g.p.m. Project Implementation Order 42-52-169-8470165. Issuing authority: G.S.A., Federal Supply Service, National Buying Division, 7 and D Streets S.W., Washington, D.C. Closing date: 4/12/57. Ref. E.S.B. 2767/57. Telephone Chancery 4411, extension 354.

Ceylon

Various items insulated cable, tape and battery terminal connections. Ten 29287. Bids to Ceylon Transport Board, 5 de Fonseka Road, Colombo 5. Closing date: 4/12/57. Ref. E.S.B. 27784/57. Telephone Chancery 4411, extension 738 or 771.

India

Cupro-nickel ingots to composition, 191 cwt. Issuing Authority, Director-General of Supplies and Disposals, New Delhi. Closing date, 11/12/57. Ref. E.S.B. 27854/57. Telephone Chancery 4411, extension 738 or 771.

Taiwan (Formosa)

Pumps of various types and chlorinators. Project Implementation Order 84-55-359-9-70453. Issuing Authority, Central Trust of China, 68 Yen Ping Nan Road, Taipei, Taiwan. Closing date, 16/12/57. Ref. E.S.B. 27672/57. Telephone Chancery 4411, extension 354.

Taiwan (Formosa)

Ten 28343 for oil, rock drills, furnaces, hose, etc. Closing date now 5/12/57. Ref. E.S.B. 23676/57. Telephone Chancery 4411, extension 354.

India

Special register circulars Ten 28419 and 28419A of 17/10/57 and 13/11/57 reference pumps for the D.V.C. Durgapur thermal power station and Bokaro 4th unit. Closing date now 30/11/57. Ref. E.S.B. 23850/57. Telephone Chancery 4411, extension 738 or 771.

Taiwan (Formosa)

Ten 28617. Air compressors. Closing date now 9/12/57. Ref. E.S.B. 24902/57. Ten 28614. Ventilation fan, pneumatic sump pump. Closing date now 7/12/57. Ref. E.S.B. 24901/57. Telephone Chancery 4411, extension 354.

Spain

Advance information: The British Embassy in Madrid reports eight decrees authorizing the Ministry of Air to call for tenders for laboratory equipment, electric cable, drilling machines, transformers, circuit breakers, switchboard, to total maximum value approximately £47,620, has been published. Ref. E.S.B. 27182/57. Telephone Chancery 4411, extension 738 or 771.

Book Reviews

Modern Techniques of Excavation, by Herbert L. Nichols, Junr. Published by Odham's Press, Ltd.; pp. 573. Illustrated. Price 70s.

Those acquainted with the author's earlier book, entitled *Moving the Earth*, will recognize the book under review as Part I of the earlier volume, except for a chapter devoted to maintenance hints which has been added.

Modern Techniques of Excavation provides a well-written, authoritative and admirably illustrated account of the practical aspects of earth- and rock-moving operations over a wide field of application. In ten chapters, it covers in considerable detail the work of land clearing, grading, drainage, digging ponds and cellars, making roads, open-pit mining, rock blasting and tunnelling. Two final chapters deal with financial management and equipment maintenance. A most useful appendix contains technical, statistical and advisory material contributed by American equipment manufacturers and trade associations, and a glossary gives definitions of over 1,200 terms.

This book will be of particular interest to those in closest touch with actual field operations—to the small contractor, the foreman, and the operative, but its fund of well-informed practical detail makes it of value to all connected with the earth-moving industry.

Diamond Drill Handbook, by J. D. Cummings. Second Edition. Published by J. K. Smit and Sons, of Canada, Ltd. (London: Bailey Bros. and Swinfen, Ltd.); pp. 655. Illustrated. Price 95s.

This revised and enlarged edition of the book, first published in 1951, follows the general pattern of the earlier work. Statistics, trends and illustrations have been brought up to date, and new information is provided on subjects of topical interest, including the orientation of diamonds, wire line core barrels, use of diesel-driven drills underground, soil sampling, drilling offshore, and drilling in conditions of permafrost.

Among the welcome and interesting chapters in this book are those dealing with standards of diamond core drill fittings, directional drilling, borehole surveying, and special applications of diamond drilling. The glossary of technical terms will be invaluable to the uninitiated, and there is a useful bibliography.

It is perhaps unfortunate that such free use has been made of quotations from current literature. This has been done at the expense of considerable repetition, and the variation in technique or terminology inevitably brought to light leads to some confusion. Replacement of repetitive matter by more precise detail, together with elimination of numerous typographical errors, might well have transformed the present volume into a textbook.

However, the handbook in its present form is remarkably comprehensive.

Pegson, Ltd., have recently published two interesting brochures. The first describes the Pegson vibrating screen, and the second the manufacturers' multi-stage pumps.

Metals and Minerals

Metals Run on Four Wheels

"All eyes on Detroit" is a common phrase of general concern to all those interested in the consumption of copper, lead and zinc. Precisely how much, is open to the statistician but in the United States, at any rate, the Automobile Manufacturers' Association has published a book in which the following interesting figures relating to materials consumed by the automobile industry in 1956 are included.

With regard to copper the U.S. automobile industry consumed 131,000 tons last year, equivalent to 7.1 per cent of total U.S. consumption amounting to 1,850,000 tons. Tonnage of lead absorbed, including the amount used in tetraethyl lead and in replacement of batteries, amounted to 504,200 tons, or as much as 42.4 per cent of the total U.S. consumption figure of 1,190,000. Zinc absorbed amounted to 279,000 tons, or 28.2 per cent of the 988,097 tons consumed in the U.S.

Other figures of interest referred to the automobile industry using 17,500 tons of nickel, or 13.6 per cent of total consumption, and 42.1 per cent of all the steel sheet used in the U.S. last year.

Little wonder that all eyes are once again riveted on Detroit in the hope that the new models will find a receptive market and so play an important part in reversing the downward trend of metal prices.

FIVE YEARS' SUPPLY OF TUNGSTEN

A Report from the Attorney-General on the Defence Production Act confirms the refusal by Congress to appropriate additional funds to continue the U.S. Government purchasing programme for stockpiling tungsten. The Report supported statements made earlier this year that the nation's supply of tungsten was sufficient to cover five years of war-time needs.

The tungsten-purchasing programme, which was put into effect in 1950, increased domestic production within two years by 50 per cent, while at the same time imports of tungsten quadrupled. U.S. production rose from 3,000 tons in 1951 to nearly 8,000 tons in 1955. In the military field the most important application of tungsten has been in "cores" for high-velocity projectiles, while the metal's ability to withstand heat, coupled with its great strength, makes it widely acceptable in alloys for jet engines and guided missiles.

BERYLLIUM—AN I.C.B.M. METAL

The advent of "Sputniks" has furnished more than a gentle prod to the U.S. Government and that country's aircraft manufacturers in their doggedly persistent endeavours to find new materials to aid them in devising bigger and better guided missiles and advanced types of aircraft.

One of the more concrete results of recent research has been the citing of

beryllium as one of the metals able to withstand the pressures of launching a satellite. This is the view of Major-Gen. William O. Senter, U.S.A.F. procurement chief at the Air Materials Command Headquarters in Dayton, Ohio, who recently declared that beryllium was a good example of a new material having the necessary revolutionary requirements. Beryllium, the General said, is six times stronger than steel (on a strength-to-weight ratio), weighs about a third as much as aluminium, and will readily withstand temperatures of 1,200 deg. F. If he continued, beryllium were used in an inter-continental ballistic missile, it could be fired into outer space miles above its present designed altitude using the power plants available. The metal's super stiffness would simplify the I.C.B.M. guidance system as the missile would be rigid in flight, thereby avoiding the flexing and rippling resulting from the use of softer metals. The General indicated that beryllium is not used at present because of its high cost and short supply. *

World production of beryl reached the record total of 12,500 s.tons in 1956, an increase of 40 per cent over 1955, states the Bureau of Mines, U.S. Department of the Interior. The largest producers were India 3,360 tons, Brazil 2,000, Belgian Congo 1,800, Argentina 1,722, Mozambique 950, S. Rhodesia 606, the U.S. 460 and South-West Africa 454.

ALUMINIUM IN ABUNDANCE

This column last week, while not unmindful that the outlook for aluminium was more sombre than it has been for a very long time, referred to several of the more important projects for expanding production of aluminium. In general, the expansion programmes referred to were initiated when demand was outstripping production, and thus it would have been extremely difficult, to say the least, for the companies concerned not to have gone ahead with plans for their completion.

However, as has been mentioned previously, the present outlook has resulted in the Aluminium Co. of Canada postponing the completion of 80,000 tons of ingot facilities at Kitimat. This kind of decision more accurately reflects the state of the market at present, a contention supported by Mr. Donovan Wilmot, vice-president of the Aluminium Co. of America, who said that the post-war era of aluminium shortages has definitely come to an end and non-integrated users need have no worries about adequate supplies in the foreseeable future.

Mr. Wilmot, who had been asked to describe the current supply outlook by a sub-committee of the U.S. House of Representatives Select Committee on Small Businesses, stated that his company's conviction, however, in the longer term, was that consumption of aluminium over a period of years would continue—as in the past decade—to grow at a rate faster than the national economy, with non-integrated users growing and pros-

pering with the trend. Indeed, despite the current over-abundance of primary metal, Alcoa remained very optimistic about the future and this year the company would spend about \$160,000,000 for increased facilities to produce basic aluminium and planned to spend \$80,000,000 for a similar purpose in 1958.

U.S. REFINED SILVER

Production of refined silver in the U.S. for the first nine months of this year amounted to 52,452,000 oz., compared with 59,197,000 oz. in the similar 1956 period, according to the American Bureau of Metal Statistics. The 1957 output consisted of 27,185,000 oz. from domestic ores and 25,267,000 oz. from foreign material. The corresponding 1956 figures were 28,649,000 and 30,548,000 oz. respectively. *

The Italian Government has approved the minting of silver coins worth 500 lire to replace existing bank notes.

U.S. BORON PROJECT

To meet the steadily increasing demand for boron products from the steel and other industries, U.S. Borax and Chemical Corp. is hastening completion of a new opencast mine and refining plant in the Mojave Desert area of Southern California. This would raise total U.S. output by some 30 per cent.

Increased demand for boron products has developed rapidly in recent years as a result of research carried on by many industries. Apart from its use in the production of high-energy fuel for jet engines, boron has become an important ingredient in the manufacture of pharmaceuticals, porcelain, enamels, plastics, steel, glass, ceramic glazing, agricultural chemicals, flame-proofing, fire extinguishing, canning and petroleum additives.

SEMI-CONDUCTOR INDUSTRY EXPANDS

The spectacular growth of the semiconductor industry in the U.S. is leading to rising demand for germanium and silicon of electronic grade. According to officials of the Hughes Aircraft Co., sales of transistors and semiconductors this year may reach \$125,000,000. Three new semiconductors based on high purity silicon have been developed by this firm. Price reductions up to 25 per cent on semiconductor grade silicon material sold to other firms was recently announced by another U.S. company, Texas Instruments, Inc., and are said to have resulted primarily from increased use of electronic devices using silicon.

It is noteworthy that in the process used by the Hughes Aircraft Co. for the manufacture of tiny crystals of silicon and germanium, gold is evaporated on to the crystals in a high vacuum chamber.

COPPER • TIN • LEAD • ZINC

(From Our London Metal Exchange Correspondent)

The weak undertone has continued during the past week on the L.M.E. and is reflected in lower quotations all round apart from the cash price of tin, and it is difficult to find any reason for expecting a reversal of the present tendency even in lead and zinc where prices have undergone the largest fall.

COPPER MARKET WEAKER

The copper market has been overshadowed by the publication of the Copper Institute's figures for October which show that during that month a record tonnage was produced from mines outside the U.S. whilst production in the latter country showed a considerable increase over the figure for the previous month and, even though deliveries to consumers indicated appreciable increases throughout the world, at the end of the month stocks on hand had risen by about 9,000 s.tons. The latter figure was helped considerably by a fall in stocks in the U.S. but, in fact, this figure was less than the deliveries made to the U.S. stockpile against price support contracts.

The actual figures for the mine production outside the U.S. were 161,690 s.tons and this was very disappointing to those who had hoped that producers throughout the world were adopting some kind of voluntary cutback in output. Many

people feel, however, that it is unwise to lay too much stress on the figures for a single month, more especially as the month of October normally sees a higher rate of production than the year's monthly average.

Trade demand in both Europe and the States has been disappointing and matters were not helped by the U.S. customs smelters' action in reducing their price again to 25½ c. per lb. within a week of putting it up ½ c., whilst in Europe the Belgian price has been reduced in two stages to the equivalent of 23.60 c. per lb. c.i.f. New York, which is below the level of two weeks ago. With stocks in official warehouses in the U.K. showing little change at 17,853 l.tons, the contango remained steady at around the £4 per ton mark. Technically, the London market is probably weaker than it has been for some time, as a number of the remaining "bear" positions appear to have been closed out during the early part of the week and there are few signs that operators are prepared to build up a long position at present levels.

SECOND I.T.C. CALL-UP IMMINENT?

The cash price of tin has continued to be supported by the Buffer Stock Manager and the tonnages of metal

which he has had to absorb have increased considerably and this state of affairs is likely to continue until either consumers enter the market in greater numbers than at present or producing countries commence operating some export restrictions.

It is generally believed that export quotas will be fixed at the forthcoming meeting of the Tin Council and that an early request for the second instalment of producers' contributions to the Tin Scheme will be made shortly, even if it has not already taken place. Interest centres on whether such contributions will be made in cash or whether most producers will prefer to supply tin on this occasion. The stocks in official warehouses continue to increase and now stand at 3,913 l.tons, but there is no method of knowing how much of this is held by the Buffer Stock and how much is free for the market, and concern is being expressed in some quarters that this state of affairs might lead to the market suddenly being confronted with a squeeze.

The three-months' quotation continues to weaken and this and the Singapore market are now marching in step. The price of the latter on Thursday was equivalent to £708½ per ton c.i.f. Europe.

LEAD AND ZINC WAIT ON TARIFF ENQUIRY

In the lead and zinc markets the former has been the weaker of the two but both are marking time at the moment pending the result of the present enquiry in the U.S. into the question of raising the import tariffs. Demand remains routine, but with a slightly larger demand developing for prompt metal the lead market has signs that the contango could be eliminated, whilst in zinc the backwardation shows signs of widening.

One of the results of the flow of lead into the States and the low price is shown in the U.S. Bureau of Mines September figures, which record a further 11 per cent decrease in production, giving the lowest monthly total since mid-1948 when the low figure was due to strikes.

*

At the end of last week the British Bureau of Non-Ferrous Metals Statistics issued their figures for September and these show substantial increases in consumption in all four metals as compared with the quiet month of August, but even more interesting are the figures which show that stocks of copper, lead and zinc showed declines whilst those of tin remained almost stationary.

Closing prices are as follows:

	Nov. 14 Buyers	Sellers	Nov. 21 Buyers	Sellers
COPPER				
Cash	£188½	£189	£183½	£183½
Three months	£192½	£193	£187½	£188
Settlement		£189		£183½
Week's turnover	5,850 tons		8,625 tons	
LEAD				
Current ½ month	£84	£84½	£79½	£80
Three months	£84½	£84½	£80	£80½
Week's turnover	4,575 tons		3,850 tons	
TIN				
Cash	£730	£730½	£730	£730½
Three months	£718	£719	£704½	£705
Settlement		£730½		£730½
Week's turnover	1,650 tons		2,960 tons	
ZINC				
Current ½ month	£67½	£67½	£66½	£66½
Three months	£67½	£67½	£65½	£65½
Week's turnover	7,250 tons		6,425 tons	

LONDON METAL AND ORE PRICES, NOV. 21, 1957

METAL PRICES

Aluminium, 99.5% £197 per ton

Antimony—

English (99%) delivered, 10 cwt. and over £190 per ton

Crude (70%+) £190 per ton

Ore (60%) basis 20s. Od./21s. Od. nom. per unit, c.i.f.

Arsenic, £400 per ton

Bismuth (min. 1 ton lots) 16s. Ib. nom.

Cadmium 11s. 3d. Ib.

Cerium (99% net), £13 18s. Ib. delivered U.K.

Chromium, Cr. 99% 7s. 2d. Ib.

Cobalt, 16s. Ib.

Germanium, 99.99%. Ge. kilo lots 3s. 4d. per gram

Gold, 249s. 4d.

Iridium, £27/29 oz. nom.

Lanthanum (98/99%) 15s. per gram

Manganese Metal (96%-98%) £310

Magnesium 2s. 3d. Ib.

Nickel, 99.5% (home trade) £600 per ton

Osmium, £20/22 oz. nom.

Osmiridium, nom.

Palladium, £7 10s./£8 0s. oz.

Platinum U.K. and Empire Refined £30/31 oz.

Imported £28 Oz./£28 10s. nom.

Quicksilver, £69 Oz. ex-warehouse

Rhodium, £42 oz.

Ruthenium, £15/£17 oz. nom.

Selenium, 67s. 9d. per lb.

Silver, 77½d. f. oz. spot and 77½d. f. d.

Tellurium, 15s. 16s. Ib.

ORES AND OXIDES

Bismuth

65% 8s. 6d. Ib. c.i.f.

18/20% in. 3d. Ib. c.i.f.

Chrome Ore—

Rhodesian Metallurgical (semifriable) 48%

£19 5s. Od. per ton c.i.f.

Hard Lumpy 45%

£19 5s. Od. per ton c.i.f.

Refractory 40%

£13 0s. Od. per ton c.i.f.

Smalls 44%

£18 0s. Od. per ton c.i.f.

Baluchistan 48%

£12 0s. Od. per ton f.o.b.

Columbite, 65% combined oxides, high grade

nom.

Fluospar—

Acid Grade, Flotated Material

£22 13s. 3d. per ton ex. works

Metallurgical (75/80% Ca F₂)

15s. Od. ex works

Lithium Ore—

Petalite min. 34% Li₂O

47s. 6d./52s. 6d. per unit f.o.b. Beira

Lepidolite min. 31% Li₂O

47s. 6d./52s. 6d. per unit f.o.b. Beira

Amblygonite basic 7% Li₂O

£26 0s. per ton f.o.b. Beira

Magnesite, ground calcined

£22 0s./£20 0s. d/d

Magnesite Raw (ground)

£21 0s./£22 0s. d/d

Manganese Ore Indian

125d./127d. per unit c.i.f. nom.

Europe (44%-48%) basis 95s. freight

98d./100d. per unit c.i.f. nom.

Manganese Ore (43%-45%)

92d./94d. per unit nom.

Manganese Ore (38%-40%)

(including duty) 8s. 5d. nom. per lb. (f.o.b.)

Molybdenite (85% basis)

£45/£47 per ton c.i.f. Aust'n

Titanium Ore—

Rutile 95/97% TiO₂ (prompt delivery)

£11 10s. per ton c.i.f. Malayan

Ilmenite 52/54% TiO₂

106s. Od./111s. Od. per unit c.i.f.

Wolfram and Scheelite (65%)

£10 per unit c.i.f.

Vanadium—

Fused oxide 90-95% V₂O₅

£17 per ton c.i.f.

Zircon Sand (Australian) (63-66% ZrO₂)

Mining Finance

Have Copper Shares Grounded?

The operating results of the Northern Rhodesian copper producers whose financial year ended on June 30, 1957, together with the results from Nchanga Consolidated whose fiscal year ended on March 31, 1957, are given in the across-column table below.

The picture presented is not a pleasant one; nor was it expected to be. The price of copper—apart from mild flurries—has been dropping gradually but persistently from its peak in March, 1956, when it was well clear of £400 a ton to its present level of around £185 a ton. But not all of this sharp fall is reflected in the operating results under review. Roan Antelope and Mufulira mines, for example, averaged between £250-£260 a ton for their copper so that results for the current year—unless a sharp reversal of the present price trend eventuates, and soon—will be even more depressing. This comment applies also to those companies in the Rhoanglo group and with particular force to Nchanga whose last accounts, ending as they did in March, were able to reflect a much higher average selling price per ton of copper.

In many ways the results shown in the across-column table below speak for themselves. The lower average price per ton of copper received reverberated right through the accounts and despite a much reduced allocation for depreciation and reserves, together with relatively light tax liabilities, net earnings only allowed shareholders distributions which, in some cases, were only unhappy reminders of the previous year's prosperity.

The question as to whether now is the time to buy copper shares as a lock-up can only be considered seriously if it can be shown that the copper share market has bottomed.

There are those who aver that this is so and while they may be right, there is a good deal to be said for the argument that while the price of the metal is, roughly speaking, around its floor level if only because steps would be taken—most likely on the other side of the Atlantic—to support the quotation if it went much lower, this is a far off cry from saying that the share prices have grounded. Indeed, prices and yields ob-

tainable as at November 20 and shown in the following table, can hardly be considered attractive bearing in mind the context in which they must be considered. Moreover, they represent more than less the operating results under review rather than being a reflection of the current year's results projected on the basis of the average copper price prevailing since the end of last June or, as in the case of Nchanga, last March.

Company	Price (Nov. 20)	Yield
Bancroft	21s. 9d.	—
Nchanga	178s. 9d.	11.2%
Rhokana	£26 10s. 0d.	8.5%
Rhoanglo	68s. 9d.	9.5%
R.S.T.	15s. 10½d.	7.9%
R. Antelope	8s. 6d.	11.0%

Some guide, but no more than that is intended, to what the current year's earnings may look like is provided by the following table wherein the profits earned in the September quarter for those companies in the R.S.T. group are shown with their equivalent annual rate. These figures are supplemented by the last column which is calculated by applying the proportionate fall in earnings from the year ended June 30, 1957, to last year's net distribution after Rhodesian tax, which reveals that "estimated" dividends next year for Roan and Mufulira would not bear thinking about at today's prices.

Company	Profit Equiv. July-annual Sept. rate	1956/1957	Est. Net Profit Div.
	(£000)	(£000)	(£000) s. d.
R. Antelope	643	2,572	7,162 4
Mufulira	1,092	4,368	10,234 2 7
Chibuluma	363	1,452	1,396 —

On the other hand, copper shares are well held by investors and are heavily influenced by Wall Street despite day-to-day happenings or results on the Copperbelt so that any assessment is complicated by the tight market and by what happens in the Dow Jones Index. Too, Detroit, as is shown in the lead note in the metal section on page 619, can play an important role in bringing copper and other non-ferrous metals out of their

doldrums. In any event, the subject is as important as it is interesting and those concerned ought to read the Leader, "Tightening the Copper Belt", on page 607 in conjunction with the statement by the chairman of the R.S.T. group on pages 624 and 625 and that by the chairman of the Rhoanglo group on pages 626 and 627.

"CASTS" FAVOURABLE TAX PROSPECTS

A Bill to replace the present minerals duty in Ghana by a profits tax ranking for double taxation relief in the U.K. is expected to be presented to the Ghana Parliament before the end of the year, states Mr. A. Chester Beatty in his address to shareholders circulated with the report and accounts of Consolidated African Selection Trust.

When this Bill is in force "Casts" will stand to benefit materially. Precisely how much is difficult to say at the moment, but during the year ended June 30, 1956, the Ghana Minerals Duty was shown as costing £268,000. Moreover, the benefits to the company which would accrue if it were able to qualify as an Overseas Trading Corporation would be substantial, and thus the possibilities of securing O.T.C. status for the "Cast" group is being examined.

One way and another, therefore, the outlook for the company is bright, particularly as the outlook during the current year appears favourable.

In any event, the prospect of securing tax reliefs has played its part in the company's decision to spend about £800,000 on a new large washing plant at Anicheche, the completion of the first half of which is scheduled to come into operation in the middle of 1959.

Germaine to the company's operations is, of course, the question of security. Police protection from illicit mining has never been adequate, but following the riots on the company's property earlier this year, the gravity of the situation is now appreciated.

During the year ended June 30, 1957, net earnings totalled £877,000, of which £872,000 was absorbed by the maintained 100 per cent dividend for 5s. stock unit.

Further details of the company's operations are given in this issue on page 628.

ANGLOVAAL'S CONTINUING GOOD PROGRESS

Two words which spring immediately to mind on reading Anglo-Transvaal's report for the financial year which ended last June are "progress" and "diversification".

Progress is apparent from a glance at the company's record over the past ten years. From £130,153 in 1949, dividends received have multiplied fourfold to reach a record £483,969 this year, due, of course, to the company's participation in many of the new flotations in Klerksdorp

OPERATING RESULTS OF COPPERBELT COMPANIES

Company	Year to June 30	Copper Sales £000	Depre- ciation £000	Taxa- tion £000	Net Profit after Tax £000	Trans- fers to Reserves £000	Net Divs. per Ord. Share s. d.
<i>R.S.T.</i>							
R. Antelope	1956	28,890	1,500	5,650	8,358	3,049	3 1½
	1957	21,241	1,250	2,945	4,216	1,198	11 ½
Mufulira	1956	31,535	2,300	6,583	9,290	2,535	15 7½
	1957	24,898	1,500	4,142	6,092	1,386	6 1
Chibuluma	1957	4,045	400	—	1,396	1,395	—
<i>Rhoanglo</i>							
Nchanga	1956*	40,346	955	9,450	16,219	6,500	30 0
	1957*	30,369	1,074	5,700	9,529	2,500	20 0
Rhokana	1956	31,700	414	6,120	15,936	7,208	70 0
	1957	24,164	479	2,900	9,872	4,155	45 0
Bancroft	1957†	204	—	—	L1,255	—	—

* Year to March 31st. † Six months only. L loss.

and the O.F.S. Among these are not a few which have yet to pay a dividend or are only just making their first token distributions, making it clear that progress is a thing of the future as well as of the past, while prospecting still continues both in the Union and in other parts of Africa.

As for diversification, no one could possibly accuse Anglovaal of having all its eggs in a golden basket. Administered by the company are gold mines ranging from the rich new Hartebeestfontein to the old, marginal Rand Leases; mines producing coal, manganese and antimony; and industrial interests ranging from timber plantations through cement to trawlers and radio manufacturers.

Net profits after tax of the parent company for the year just ended amounted to £813,045, compared with £776,628 in 1956. From this are paid dividends at the same rate as last year, including the ordinary of 50 per cent, and £381,999 is carried forward, compared with £385,830 brought in. At the date of the balance sheet, revenue reserves stood at £3,881,999, while the excess of assets over liabilities was £6,657,419. On November 20 the "A" shares were quoted at 28s. 3d. to yield a gross 8.8 per cent, which seems high for a company of this calibre.

ST. HELENA STRIKES 1,070 IN. DWT.

St. Helena Gold Mines announced after market hours on Wednesday a reef strike in a borehole of 1,070 in. dwt. The borehole was put down in the eastern portion of the lease area, ap-

proximately due east of No. 4 shaft and about 1,000 ft. from the boundary of President Brand. The Basal reef was cut at a depth of 4,405 ft. and assayed 27.09 dwts. over a width of 39.05 in. Core recovery was complete. No values were encountered on the Leader reef, but immediately below the horizon of this reef at 4,375 ft., a "middle reef" was cut and yielded 66 dwts. over 9.3 in., equivalent to 614 in. dwts.

GOLD FIELDS' IMPROVED EARNINGS

New Consolidated Gold Fields, the wholly owned subsidiary of Consolidated Gold Fields of South Africa, advanced its untaxed profits during the year to June 30, 1957, by as much as £850,000 to £2,800,000.

The most obvious source accounting for this advance was the jump in profits from share-dealing activities, which moved ahead from £457,000 to £1,153,000. Nevertheless, dividend and investment income also showed a sharp improvement, the gross figures going ahead from £1,860,000 to £2,130,000.

With maiden payments and higher dividend distributions coming from several of its gold mining investments, it is easy to understand the increase in the income from the company's investments. But the marked expansion on realization of investments is more difficult to explain, unless it can be assumed that a large part of the increase rose from the disposal of the company's relatively small holdings in Trinidad Oil when that company was taken over by an American concern last year. Con-

fimation of this must await Mr. Annan's statement at the annual general meeting, which will be held on December 12 next.

In the meantime, it is to be noted that the year's dividend, which has been maintained at 4s. per £1 share, has entailed the payment of an additional £84,400 because of the new ordinary shares issued in July ranking for the final payment.

This share issue of 979,202 ordinary £1 shares has raised the ordinary share capital to £5,875,212. A loan of £1,958,404 has also been received from the parent company since the end of last June.

NATIONAL MINING IN CANADA

Mr. C. J. Burns, chairman of National Mining Corporation, in his statement to shareholders, an extract of which appears on page 628, states that since March 31 last, the company has taken the opportunity of increasing its holdings in Canada, particularly by the purchase of shares in Lado Co., a land acquisition and development company operating in the Winnipeg, Saskatchewan, area.

BANCROFT'S MUDDY DEBUT

Bancroft, the Copperbelt's youngest producer, has opened its profit and loss account with a net loss after all charges of £1,255,608 for the six months ended June 30, 1957. Something of the sort was only to be expected in the mine's first six months of operations, especially in view of Bancroft's known difficulties with water, mud and weak strata, and the loss of production due to labour troubles.

Sir Ernest Oppenheimer, the chairman, indicated that arrangements for permanent financing may be possible "in the next few months". That this would be in the company's interest is apparent from the balance sheet, which shows that of Bancroft's capital of just under £19,000,000, £9,250,000 is in the form of notes or loans repayable before 1961.

LONDON MARKET HIGHLIGHTS

In the early part of the past week, the Kaffir market might have been said to be consolidating its previous advance. Prices tended to ease off slightly and it was noticeable that business fell away with the easier tendency. The later dealings on Wednesday, however, brought a complete change of heart, and with little stock about in London, prices once more began to surge ahead. Free State Geduld (79s. 4½d.) were bought on the theory that having underwritten the F.S.G. issue at 80s., Anglo American would presumably be glad to see the market higher over the next few weeks. St. Helena jumped to 34s.—their highest since 1954—on Wednesday in front of the 1,070 in. dwt. borehole result. Meanwhile, President Brand (51s. 6d.) were a firm market all along on the existence of a large buying order. Klerksdorp (4s.) continued their recovery on hopes of a market being found for their uranium and among Finance Groups Gold Fields (51s. 9d.) improved in front of the annual report.

There is no doubt that many observers feel that with gold shares at their still-depressed levels, a strong year-end advance may well be seen in view of the lack of scope for investment elsewhere at present.

In the face of a continued slide in the copper price, uncertainty on Wall Street, and the sharp fall in September quarter profits earned by Roan and R.S.T., it was hardly surprising that copper shares remained an uncertain market. Only the

existence of a large bear position kept prices from falling further than they did.

Nothing short of a sustained rise in the metal (now £185 a ton) can save the share market from a further downturn. Current yields based on last year's dividends are not particularly generous and those dividends were earned with a copper price average substantially above £250 a ton.

One weak spot was Bancroft, which fell to 20s. in front of the annual report and its news that a further share issue was being contemplated. Nchanga lost 8s. 9d. over the period to 178s. 9d., but Rhodesia-Katanga rallied to 14s. 6d. on hopes of progress in the dewatering programme at Kansanshi.

Tin shares seemed little affected by the persistent decline in the forward metal price. Sungai Besi, at one time, rose to 13s. 3d. on the higher dividend and profits. Temoh (5s. 9d.), on the other hand, responded accordingly to their lower dividend and profits.

At one time, lead-zinc shares moved ahead smartly on hopes that the lowered U.S. discount rate would mean a revival in commodity prices. The movement came to an abrupt halt, though, when base-metals continued to ease and Lake George shocked the market with news of a collapse in profits earned last year. Lake George dropped 1s. 4½d. to a three-year low of 5s. 4½d. and Consolidated Zinc (55s. 3d.) gave up 1s. 3d. of their previous day's rise.

WANKIES' RAILWAY DIFFICULTIES

Although Wankie Colliery continued to expand its sales and output in the year ended in June, the rate of expansion is noticeably slowing. This is directly attributable to the difficulties experienced by Wankie in obtaining sufficient trackage, both for railings to the north and to the two export ports of Lourenco Marques and Beira. Export is a new departure for Wankie, the first shipload of 7,000 tons having left Lourenco Marques during September. In view of the railway difficulties, however, Mr. T. Coulter, the chairman, sees little prospect of export sales on any large scale for some years yet, in spite of the acceptability of the mines' high-grade product overseas.

Profit before tax in the year to June was £1,227,030, an increase from £1,141,647 in 1956. Dividends totalling 1s. 1½d. per share and absorbing £577,640 (1956, 1s., £441,250) have been declared during the year.

Mr. Coulter's statement appears on page 627.

IPOH TIN'S STRONG FINANCIAL POSITION

Ipoth Tin's operations for the year ended March 31, 1957, were somewhat restricted because of the necessity for its

dredge to indulge in cleaning up various patches of virgin ground and having to cut its way through tailings to the main virgin area. Nevertheless, untaxed earnings were slightly better than in the preceding year and the dividend was maintained at 2s. per 8s. share in the £80,000 issued capital.

Mr. R. Ellerton-Binns, chairman, in his address to shareholders circulated with the accounts, says that results for the current year ending March 31, 1958, will show an improvement on those under review as output can be expected to rise following the dredge's entry into virgin ground towards the end of September.

The balance sheet reflects the company's strong position, and it is to be noted that net liquid assets are equivalent to slightly more than 26s. per share. This compares oddly with the current market price of around 12s. 6d. per share. At their present price the shares give the attractive yield of 16 per cent and definitely merit the attention of investors for both yield and appreciation.

Moreover, it would appear that the company has nearly exhausted its remaining tin-bearing land, and should Iphob be a liquidation prospect in a year or so, the shares at their present price would be an even more interesting purchase.

CAPPER PASS AND BOLIVIAN ORES

From the profit and loss account reflecting operations of Capper Pass and Son for the year ended March 31, 1957, it would appear that the net profit for the year at £120,843 was less by more than half the £264,090 earned in the preceding year. But these figures take into account profits/losses resulting from changes in the metal prices. Thus in 1955-56 earnings contain a large element of stock profit represented by the transfer of £100,000 to the Market Reserve Account, whereas in the year under review with prices going the other way the company has drawn on reserves to the extent of £25,000. The resulting real profit after tax for the year ended March 31, 1957, was therefore £145,843, which compares with the previous year's figure on the same basis of £164,090.

This relatively small drop in earnings was attributed by Mr. A. D. Pass, chairman, in his statement circulated with the accounts, to the continued rise in costs which have followed the trend of inflation fairly closely; and secondly, to rather less raw materials than the company would have liked to keep its plant working at full capacity.

On the first point, Mr. Pass again stressed the difficult position of the company selling as it does its services internationally against a background of inflation increasing at a faster rate in the U.K. than in competitive countries. On the second point, Mr. Pass was more hopeful in that he believed the company would receive increased supplies of low-grade Bolivian tin ore now that the U.S. Government has ceased to operate their subsidized tin smelter in Texas. This is important, as while the tonnage shortfall last year was not serious quantitatively, it is the marginal tonnage which can make a disproportionate difference to any year's profits.

The company in association with others has gone some distance towards ensuring supplies from Bolivia through a joint loan to the Bolivian Government to help it participate in the tin restriction scheme.

The loan is interest-bearing and is secured on the stock of cash and tin under the control of the Buffer Pool. The loan is being recovered on behalf of the lenders in regular instalments by deduction from the proceeds of tin ores bought from Bolivia by one of the participating companies. This will help

during the current year, as will the company's progress in the extraction of precious metals which is playing a greater part in its business. But if prices of copper, tin and lead continue to decline, it will be necessary for a further withdrawal to be made from the Market Reserve Account.

FINANCIAL NEWS AND RESULTS IN BRIEF

No Dividend From Lake George.

Lake George Mining Corporation have announced in a preliminary profit statement that results for the year to June 30, 1957, of Lake George Mines Pty., the operating company in Australia, were seriously affected by the heavy fall in base metal prices and by the continued absence of any demand for their pyrites production. In addition there was an increase in working costs and, in the last half of the year, a sharp rise in sea freights.

The Group Accounts for the year (subject to audit) show a profit of £1,023 (£411,942) after providing £55,032 (£69,815) for depreciation of fixed assets and £4,800 (£4,000) for the maintenance of property. After bringing in £27,858 from last year and £5,828 U.K. taxation over-provided, and deducting £42,730 (£166,630) for taxation, there was a group deficit of £8,021 to be carried forward.

The taxation charge of £42,730 was on the profits of the operating company and arises primarily from an adjustment of £36,634 in respect of an allowance for future development claimed in the previous year. As no dividend income was received from the operating company, the directors regret that no dividend can be paid. Meeting, London, January 7, 1958.

Temoh Profits Slump.—A preliminary statement from Temoh Tin Dredging covering the year ended June 30, 1957, reveals that net profits were £3,474. This compares with £14,603 last year. A dividend of 6d. per share will be recommended at the meeting on December 20, against 1s. 6d. in 1956. Mr. R. Ellerton Binns is chairman.

New Broken Hill an O.T.C.—In announcing an unchanged interim of 2s. per share New Broken Hill say that the year's profit before tax will be considerably lower than last year's, but that O.T.C. benefits will absorb most of the fall. The final dividend should, therefore, be maintained at the 1956 level of 3s. per share.

Good Year for Sungai Besi.—In the year to March 31, 1957, Sungai Besi Mines earned a net taxed profit of £166,520, a sharp increase from the previous year's £93,237. However, O.T.C. benefits account for some £46,000 of the improvement, taxation only absorbing £49,258 against £96,017. It is pointed out that the figure for tax is somewhat lower than it would be in a normal year as an O.T.C. because of transitional adjustments. The recommended final of 7.2d. per share makes a total distribution of 2s. 9.6d., which compares with 1s. 7.2d. last year. Meeting: London, December 19. Mr. G. W. Simms is chairman.

South Crofty Tells 'em.—In a note issued with their return for October, South Crofty, the Cornish tin producer, point out to the A.E.U. that "there's no more where the last lot came from".

They bear out this contention by giving provisional results for the first nine months of the year. According to these, mineral revenue during the period was £272,600. From this had to be met working costs (excluding depreciation) of £277,700 and capital expenditure of £39,800. The company points out that during 1957, working costs have risen sharply without any increase in productivity, while tin prices have fallen to the lowest level permissible under the international agreement. The one bright spot is that South Crofty hopes to see an increase in its revenue in the spring of 1958, when its new heavy-media separation plant, now under erection, is in full production.

S.A. Torbanite.—Results of S.A. Torbanite Mining and Refining (SATMAR) in the year ended June 30, 1957, show very little change from the previous year. Profit before tax rose to £117,205 from £103,538 but taxation absorbed the increase, leaving taxed earnings fractionally lower at £106,494. The recommended dividend is unchanged at 10 per cent. In his review the chairman, Mr. S. G. Menell, says that the near-exhaustion of the company's Ermelo mine may mean extensive alteration of the refinery to process imported crude. This would involve considerable additional capital investment. Meeting, Johannesburg, November 29.

Kepong Dredging.—A preliminary statement from Kepong Tin Dredging says that "there would appear to be little doubt that this company could qualify as an O.T.C. as from April, 1957, but . . . (at present) it would not appear to be of advantage to the company to elect to be treated as such". Profits after tax in the year ended June 30, 1957, almost doubled from £17,425 in the preceding year to £34,719 this time, in spite of taxation which expanded similarly to £17,367. A dividend of 6d. per share on the old 5s. shares was paid earlier this year, and a final of 1s. 1½d. on the 3s. shares is recommended. This compares with a single payment of 9d. last year. Meeting: London, December 19.

Pahang Consolidated Earns More.—Pahang Consolidated, one of the few major lode tin mines in the Federation of Malaya, earned a profit after tax of £113,440 in the year ended July 31, 1957. This compares with £121,373 in the previous year. The difference is more than accounted for by an increase in taxation from £152,152 to £168,275, the latest figure being calculated on the basis that the company is not an O.T.C. The dividends recommended are in effect unchanged at 15 per cent on the preference stock and 50 per cent on the ordinary as increased. At the date of the balance sheet net current assets were about £965,810. Meeting, London Dec. 12.

(Continued on page 630)

RHODESIAN SELECTION TRUST GROUP OF COMPANIES

Incorporated in Northern Rhodesia

The following are abridgments of the Statements dated October 18, 1957, by the Chairman, Sir Ronald L. Prain, O.B.E., circulated to Members.

RHODESIAN SELECTION TRUST LIMITED

My Statement this year is presented against the background of a copper market and industry situation which has completely changed in the last eighteen months.

Up to March, 1956, the copper industry of the world had for many years enjoyed a period of unprecedented prosperity. This was based on an uninterrupted demand for copper arising from major schemes of reconstruction and development put in hand after the war, of military requirements in particular caused by the Korean War, and by governmental stock-piling policies.

These cumulative developments had combined to create a shortage in supplies, with the inevitable consequence of a price increase. The resulting prosperity was not viewed by all without serious misgivings about the future; in the short run the possibility of a severe reaction, in the long run the loss of many of copper's traditional uses.

The same shortages and high prices caused both public and private expenditure on the development of new mines, many of which have come into production in the last two years. It is this feature which has reversed the trend and the copper market is at present in a condition of over-supply. The inevitable price reaction has occurred with a speed and severity which has surprised most observers.

The year ended June, 1957, saw our profits of the previous year approximately halved, but nevertheless they cannot be deemed unsatisfactory by any other standard. The current year, short of any major development not at present foreseeable, will again see a reduction in our profits.

Chambishi and Baluba

Last July the Chambishi company advised us that to date the directors had not been able to arrange finance on terms which they would consider satisfactory for the purpose of opening up the Chambishi mine, at a cost of £13 m. to produce 25,000 tons of copper per annum.

In present conditions it is not possible to arrange for the raising of sums of this magnitude on suitable terms, and the development of Chambishi will therefore have to continue to wait for more favourable financial conditions. The matter is constantly under consideration by the Chambishi directors.

The exploration work which continues at Baluba has extended our knowledge of the characteristics of the orebody. There is no intention at present of developing this property, partly because of the continued requirement to delimit the extent of the orebody, partly because its future may be tied up with developments on the neighbouring Muliashi property belonging to Roan Antelope, and partly because of the present state of the cobalt market. It will be recollect that as far as is known Baluba, which is primarily a copper deposit, is also the largest undeveloped cobalt property in the world.

Baluba thus represents part of this Company's future, rather than present, assets and one which we are confident will prove to be a most important property in due course.

Financial

Although we continue to diversify our interests gradually, our income as usual comes predominantly from the dividends of Mufulira and for the past year brought us in an income of £3.1 m. We paid an interim dividend of 8d. per share, less taxes, and a final of 1s. 4d. per share, less taxes, is now recommended. This will cost £1.9 m. and will allow the transfer of £200,000 to General Reserve, which will be utilized for various commitments in regard to those companies chiefly concerned with prospecting and will permit a further strengthening of the cash position.

Conclusion

In my opinion the short-term outlook for the copper business has seldom been more confused and he would indeed be a rash man who ventured to express a view as to what course the copper market might take during this financial year. Not only are normal copper market considerations involved but, on this occasion, we are concerned with greater and more general world tendencies, which are affecting other commodities and may affect the general level of world trade.

It is more permissible to take a long view, and indeed the mining business consists, and always has consisted, in the taking of the forward view. On this basis I feel that the fall in the price of copper which, as I said earlier, has surprised most observers by its severity and speed and which may cause the industry many short-term problems, may on the other hand be a blessing in disguise. Just as at high price levels we were concerned about the future of the industry, so at current levels there can be little doubt that the consumption of copper will be greatly stimulated and should assure for the industry the continuance of its historical growth factor.

MUFULIRA COPPER MINES LIMITED

Production of ore at 4.5 m. tons was the highest and the mill grade, at 2.86 per cent. was the lowest since the commencement of operations. This fall in grade is part of a planned readjustment consequent upon the adoption of mass mining methods. Production was just over 100,000 long tons blister, also a record. Sales totalled 95,942 long tons, made up as to 30,304 tons cathodes, 42,300 tons wirebars and 23,338 tons blister.

Mufulira is now in a position to produce substantially all its production in the form of electrolytic copper and the production for the current year is expected to be entirely in that form.

The cost of production averaged £145 per long ton of copper in all forms, delivered buyers, as compared with £153 per ton last year. Reductions in costs occurred on account of lower mineral royalties, which are related to the price of copper, and on account of other factors which are geared either to the price of copper or to our profit margin per ton.

If these variable costs are eliminated in a comparison with costs of the previous year, we find that there is an increase in other costs of £12 per ton. The main factor in these increased costs is that of railage.

Results for the Year

The average sales price was £259 per ton, a decrease of £82 compared with last year. The profit margin per ton decreased from £187 to £114 for the year under review, and the gross profits amounted to £10,467,000 to which has to be added the increase in the value of copper stocks and interest earned.

Tax amounts to £4,142,000 and £1.5 m. has been placed to Replacements Reserve. This Reserve stood at the end of June at £2,185,000, which bears a realistic relationship to the amounts which we expect to spend on replacements during the current year. The appropriation to General Reserve is £1,350,000.

The net profit amounted to £4,742,000. An interim of 3s. 3d. per share, less taxes, was paid and the final dividend now recommended is 6s. 6d. per share, less taxes.

For reasons connected with the present overall world copper position, we decided to curtail production from June 1, 1957, to a rate equivalent to 90 per cent. of our capacity. Our target for the current year is thus 93,000 long tons of copper, of which 3,000 tons may be required to go into stock build-up in view of the expansion programme at Mufulira.

Expansion Programme

We have brought in about 21 m. tons of new ore reserves, which represent part of the new reserve on Mufulira West. Under the expansion programme we expect for an expenditure of about £16 m. to be able to bring in additional copper production beginning in 1961, to the extent of a further 55,000 tons per annum over our present capacity. This will make the Mufulira operation as a whole, in terms of copper production, the second largest underground copper mine in the world.

Some £2,000,000 will be spent on additional European housing; the finance for this will be found from outside sources. Towards the remaining capital cost of £14,000,000 we have raised £7,000,000 by a new issue of Debentures which have been privately placed. These Debentures, which carry an interest rate of 6½ per cent. per annum, have been issued at a price of £98 per cent., with calls spread in equal instalments over four years. The interest rate will be somewhat higher until the whole issue is fully called. The maturity of these Debentures extends from 1967 to 1982, we having the right to redeem during this period at varying rates of premium.

It is the Board's present intention that the remaining £7 m. will be found from the Company's internal resources over the next few years.

Conclusion

The prospects for the current year, short of any major development not at present foreseeable, would not appear to be as favourable as those which obtained last year. The short-term outlook has seldom been more confused. A fluctuating relationship between supply and demand is a normal feature of trade in the world's basic commodities and we do not regard the present state of over-supply as other than temporary.

ROAN ANTELOPE COPPER MINES LIMITED

Production of ore at 5.85 m. tons was the highest and the mill grade at 1.95% the lowest since the commencement of operations. The policy of lowering cut-off grades enabled a higher mining recovery to be achieved. Production of blister copper was 86,294 long tons.

The cost of production averaged £156 per long ton of blister delivered buyers, as compared with £167 per ton last year. Reductions in costs occurred on account of lower mineral royalties, which are related to the price of copper, and on account of other factors which are geared either to the price of copper or to our profit margin per ton.

If these variable costs are eliminated in comparison with costs of the previous year, we find that there is an increase in other costs of £11 per ton. The main factor in these increased costs is that of railage.

Financial Results

The average sales price was £251 per ton, a decrease of £86 compared with last year. The profit margin per ton of copper decreased from £169 to £95 for the year under review, and the gross profits amounted to £7,757,000 to which has to be added the increase in the value of copper stocks and interest earned.

Tax amounts to £2,945,000 and from the net profit appropriations have been made to Replacements and General Reserves. The former appropriation is £1,250,000 and this Reserve stood at the end of June at £2,672,000. The appropriation to General Reserve is £1,150,000.

The net profit amounted to £3,067,000. An interim of 6d. per share, less taxes, was paid and the final dividend now recommended is 1s. per share, less taxes.

Since the end of the financial year the price of copper has fallen still further and our profit margin has thus been again reduced.

Mine Position

For reasons connected with the present overall world copper position, we decided to curtail production from June 1, 1957, to a rate equivalent to 90% of our capacity. Our target for the current year is thus 80,000 long tons of copper, of which 2,500 tons may be required to go into stock build-up for our pipeline requirements, and as part of a steady build-up of stocks for the purpose of entering the electrolytic refining field.

During the year much progress was made in the construction of the electrolytic copper refinery at Ndola, owned by this Company's subsidiary, Ndola Copper Refineries Limited. The first section of this plant is expected to come into operation during 1958 and the second half early in 1960.

CHIBULUMA MINES LIMITED

When allowance is made for delays due to labour disputes, the mine maintained its scheduled rate of production which is about 40,000 tons of ore per month. The grade was higher than average, both for copper and cobalt. Mining costs were satisfactory. Remarkably high recoveries have been achieved, both for copper and cobalt. Overall costs per long ton of copper may also be considered satisfactory.

Copper and Cobalt Treatment

Chibuluma is dependent to some extent on being able to smelt its copper

concentrates at one or more of the Copperbelt smelters, and at times this may involve the necessity to stockpile concentrates until smelting capacity becomes available. This situation occurred during the past year and Chibuluma finished the year with a stock of copper concentrates containing about 9,200 long tons of recoverable copper. It is expected that these concentrates will be smelted during this financial year, thus resulting in a metal production in excess of our regular rate.

The first stage of the cobalt plant at Ndola has been commissioned. In this plant the concentrates are converted to matte. Arrangements were entered into for the treatment of this matte in Belgium; and the returnable cobalt metal will be used to repay in part our loan from the United States Government.

Consideration continues to be given to the question of completing stage 2 of the cobalt plant which should enable us in due course to produce our own cobalt metal.

Stage 1 of the cobalt plant has cost already more than our original estimates, and stage 2 would involve further capital expenditure. In coming to a conclusion it will be necessary to weigh this consideration in the light of our assessment of the future of the cobalt market.

Results for the Year

Copper sales amounted to 15,958 tons at an average revenue of £253 10s. per ton. No cobalt was sold and it is unlikely that we shall have any for sale to the market while any part of the U.S. Government loan is outstanding.

The gross trading profit was £2,236,000. A slight decrease in stocks has to be deducted from this, and after including loan interest to the sum of £234,000, the net profit after crediting interest received was £1,796,000. Under the Federal tax laws applying to new mines no tax is payable on these profits.

Under our loan agreement with the General Services Administration of the U.S. Government we are obligated during the current financial year to supply metal to the Administration equivalent to 75% of these net profits by way of servicing their loan. After adding back G.S.A. loan interest the sum due is £1,512,000 and this will be allocated firstly against accrued interest, and then the balance against redemption of loan capital. We expect during the current year to have repaid all arrears of interest and to have made a first redemption of approximately £1 m., thus reducing the outstanding loan to £4 m. at June 30, 1958.

After appropriating £400,000 for replacements, the balance of profit will be transferred to General Reserve principally for the purpose of making provision for loan repayments. Accordingly £1,395,000 is being transferred and this leaves £3,000 to be carried forward on Profit and Loss Account.

Conclusion

The Mine has got off to a good start. I must continue to draw attention, however, to the fact that its costs are at present running somewhat below what they may be expected to attain as time goes on and we have to mine nearer to, and eventually below, the average grade.

The future of the cobalt market is at present somewhat uncertain and until we can see more clearly we should be unwise to count on cobalt as a worth-while contributor to our profits.

U.K. ENGINEERING AND MINING GROUP WITH AUSTRALIAN SUBSIDIARY COMPANY REQUIRE:

1. PRACTICAL GEOLOGIST for prospecting and mining operations. Should be fully experienced in exploration and testing for metallic ores in alluvial deposits, experience in concentration and separation processes an advantage.
2. MINING ENGINEER for development work on concentration and separation processes and thereafter to act as Chief Engineer covering a number of installations.

Experience should have provided a complete knowledge of the latest practice in hydraulic and other concentration processes and in mechanical and electrostatic separation of alluvial ores.

QUALIFICATIONS NECESSARY for the above appointments:

- (a) Age under 38.
- (b) University training to degree standard and particularly well qualified in hydraulics.
- (c) Practical experience and proved practical ability over several years in the class of work described.
- (d) Appointees to be willing to undertake a preliminary period of work in the U.K. and then to continue their work in Northern Territories and New Guinea and other parts of Australasia.

CONDITIONS OF EMPLOYMENT:

- (i) Liberal commencing salaries according to qualifications and experience.
- (ii) Superannuation Scheme.
- (iii) Free first-class passages, including family.

The positions offer considerable scope for further advancement and should only be considered by prospective applicants who are capable of hard work and original thought.

Applicants must have the right personality to lead as Executives and the ability to reach eventually positions of top seniority in the Organization.

Applications, which will be treated in confidence, should be sent in the first place to the Secretary, 18 Queen Street Mayfair, London, W.1. They should be comprehensive, give full personal details as well as particulars of professional training and practical experience, should describe the class of work previously undertaken by the applicant in some detail, and give particulars of previous salary levels.

RHODESIAN ANGLO AMERICAN LIMITED

(Incorporated in Northern Rhodesia)

CONFIDENCE IN LONG-TERM OUTLOOK SIR ERNEST OPPENHEIMER'S REVIEW

The following are extracts from the Statement by the Chairman, **Sir Ernest Oppenheimer**, which has been circulated with the Annual Report and Accounts for the year ended June 30, 1957:

The copper-mining companies, which are our main source of income, have all declared reduced dividends during the past year. In consequence, the net profit for the year at £5,155,235 is about £2,218,000 less than it was in the previous year, when a record profit was earned.

It must also be borne in mind that the dividends from Nchanga, Mufulira and Broken Hill brought to account this year, reflected to some extent periods when metal prices were higher than now. Unless, therefore, there is a considerable increase in the price of non-ferrous metals, particularly copper, in the next four months, our income during the coming year must be further reduced.

Finance

As you know, we have been able to follow an energetic policy of investment outside the copper-mining industry itself without calling upon stockholders to subscribe new capital and at the same time we have been able, over a number of years, to declare satisfactory dividends. We have this year decided to transfer £900,000 to general reserve, which now stands at £4,000,000, and we have recommended a final dividend of 5s. net which, together with the interim dividend of 1s. 6d., makes a total of 6s. 6d. for the year. We anticipate that the amount of profit transferred to general reserve for the purpose of following up our investments will meet our commitments to subscribe capital for Rhodesian Iron and Steel Corporation, which is being rapidly expanded, and also provide our share of the money required by the exploration companies in which we are interested. The producing copper companies have for many years been self-financed from retained profits, and we have not, therefore, been called upon to provide capital for these.

Bancroft, however, is a new mine which has not only had to overcome considerable initial mining difficulties caused by difficult ground and water, but has come into production at a time when the price of copper is the lowest that it has been since the London Metal Exchange re-opened. Our interest in this mine is principally through our large shareholding in Rhokana Corporation, and it is of prime importance to us that Bancroft should be provided with the capital it requires to complete its current programme and to reach the profit-earning stage. Temporary loans of £3,500,000 have been arranged by Anglo American Corporation for this purpose until a scheme for permanent finance can be evolved. The development of Bancroft is going ahead steadily and I am confident that the difficulties are being overcome and that the mine will become a large and profitable producer.

The Wankie Colliery, in which we are large shareholders, is now able to supply all the coal required by industry and other consumers in Rhodesia, and has also begun to export on a small scale. Since technical control of Wankie was taken over by Anglo American Corporation in 1953, the colliery's productive capacity has been increased from

2,500,000 tons to 5,000,000 tons. But until recently output has been restricted by the railways' shortage of rolling stock. However, this problem has now been overcome largely owing to the assistance given by our associated company, Anglo American Rhodesian Development Corporation, Limited, which has already provided the railways with more than 2,500 trucks on hire and has now undertaken to provide a further 1,200.

We have also an important interest in Rhodesian Acceptances, Limited, which is making a contribution to the establishment of a money market in Rhodesia. Now that the Central Bank of Rhodesia and Nyasaland is fully operative and has introduced a weekly issue of Federal Treasury Bills, steady outlets for short-term funds are available.

Copper Price

Returning to copper, I consider that the price has fallen lower than the oversupply position of the metal justifies. For various reasons, one of which was

American encouragement to domestic producers to expand production or to open up new mines, a surplus of copper developed during 1956. The rate of consumption, of course, depends on the tempo of industrial activities throughout the world, particularly at present in America and in Europe, where there has been a temporary check to the upward surge to which we have become accustomed. It seems to me that, although copper, with most other metals, will remain vulnerable to any slowing up of industrial activity or to anti-inflationary steps, the pace of development in the world can only be temporarily retarded. There is too much work to be done in developed and undeveloped countries for progress not to resume its advance. There seems to be no reason why the total world output of copper should not very soon find ready markets at more satisfactory prices.

At the present lower prices there is no talk of the substitution of other metals and materials for copper. On the contrary, there are good indications that a number of manufacturers who, during the very high price period, switched to other materials are now changing back to copper. I am, therefore, confident that the outlook for the product from which our main revenue is derived is good.

RHOKANA CORPORATION LIMITED

(Incorporated in Northern Rhodesia)

SIR ERNEST OPPENHEIMER ON COPPER PRICES

The following are extracts from the Statement by the Chairman, **Sir Ernest Oppenheimer**, which has been circulated with the Annual Report and Accounts for the year ended 30 June 1957:

In common with copper-producing companies throughout the world, Rhokana Corporation has felt the effects of the progressive decline in the price of copper from the peak level of £436 a ton to which it had advanced in stages over the post-war years up to 1956. At the beginning of July 1956, when the Corporation's operating year began, the prevailing price for copper was £265 a ton; by 30 June of this year it had fallen to £217. The average selling price of our production for the year was about £100 a long ton lower than it had been for the preceding twelve months. In consequence, the revenue derived from sales of copper fell sharply; and, since similar circumstances caused a marked reduction in the profits of neighbouring copper companies in which the Corporation has substantial investments, the Corporation's revenues from these sources also decreased. The total profits, after provision for taxation, amounted to £9,872,000, as compared with £15,937,000 for the 1955/56 financial year—a reduction of £6,065,000.

Since the end of the Corporation's financial year the price of copper has moved to lower levels. At these levels the margin of profitability for some copper producers becomes very thin—if it exists at all; but on the Northern Rhodesian Copperbelt we are fortunate in being able to operate our mines profitably even under such depressed market conditions.

Later in this statement I shall attempt to assess some of the factors that are influencing the metal market. In the meanwhile current conditions call for the exercise of great care and caution in all aspects of policy. This will be apparent in the appropriations we have made from

the past year's profits. There was available for disposal a total of £10,653,000, comprising a net profit of £9,872,000, an amount of £232,000 no longer required as a provision for taxation, and £549,000 in unappropriated profits. It was first decided to appropriate £3,500,000 to cover capital expenditure. We also considered it prudent to transfer £647,333 to general reserve, thereby increasing that reserve to £5,500,000. We were then able to recommend a final dividend of 35s. Od. net, which, with the interim dividend of 10s. Od. net made a total distribution for the year of 45s. Od. net, equivalent to £5,625,005. After these and other minor appropriations, it was possible to increase the carry forward of unappropriated profits from £548,642 to £845,397.

Capital Expenditure

The capital expenditure commitments of the Corporation have been carefully reviewed with a view to effecting economies. Nevertheless not only current operations but the maintenance of optimum efficiency in future operations will necessitate expenditure during the current year.

A new shaft is being sunk in the Mindola section of the mine, primarily intended to provide adequate ventilation for mining in this area to be carried to greater depths: in order, however, to increase the flexibility of mining operations and to achieve a better balance in drawing tonnage from the Nkana and Mindola orebodies the shaft is to be equipped for hoisting ore as well as for ventilation. It will enable us to draw an increased proportion of the ore tonnage from the higher grade Mindola orebody as policy may dictate and is clearly an important and essential project.

Encouraging results that have been obtained in research into the application of improved techniques to the process of recovering copper and cobalt. In this case, too, it would be false economy to

stop investigations which promise greater efficiency.

Copper Price

The movement in the copper price conforms with the trend of all base metal prices: and this fact points to a general tendency arising out of economic conditions in the world as a whole. The slowing down of industrial activity, especially in the United States of America, has been a major factor in the gradual easing of demand for a variety of metals. The influence upon the price of copper has been accentuated by circumstances peculiar to the copper industry. The higher prices for copper in 1955 stimulated the establishment of new low-grade copper producers and the expansion of the operations of old and well-established producers. A large additional tonnage of copper came from marginal mines in the United States of America, which were brought into production under the Defence Production Act with such inducements as cheap loans, accelerated amortization and floor price contracts. There has thus been a large expansion of copper output, reaching its peak at a period when general economic conditions in the world have placed some restraint on the expansion of demand.

It is difficult at this stage to foresee the duration of the current recession in general economic and industrial activity. The short term position will require to be watched closely by copper producing countries, but in my opinion the progress of modern industrial civilization should inevitably result in increasing demands for copper and the restoration of the balance of supply and demand.

Group Output Policy

In the meanwhile, enforced reduction of copper production, coupled with voluntary measures of a similar kind, may eventually result in bringing greater stability to the market. Various producers have, in fact, announced cuts in production. The copper companies of the Rhodesian Anglo American Group, of which Rhokana Corporation is one, have announced no such cuts; but circumstances will result in an involuntary and transitory reduction in planned output for the Group of over 10 per cent. for the current year. The principal cause is the difficulty that has been experienced at Bancroft Mines in establishing routine mining operations on the scheduled basis. A subsidiary reason is that the industrial dispute on the Copperbelt in July this year caused a loss of more than half a month's output.

Another matter of interest was the question of determining a common Rhodesian price for copper based on the London Metal Exchange quotations but designed to eliminate the day-to-day fluctuations that characterize dealings on the Exchange. Discussions of this subject were abortive and the London Metal Exchange price is now the accepted basis for the pricing of Rhodesian copper for contractual purposes.

The first production of uranium from the Federation of Rhodesia and Nyasaland began in May this year when the recovery plant for the treatment of uranium-bearing ore from the Mindola section of the Corporation's mine was brought into operation. Although the extent of the uranium-bearing ore in the mine has not yet been fully determined, there is not a large tonnage and the treatment of the ore will not yield anything more than a small profit.

WANKIE COLLIERY COMPANY LIMITED

(Incorporated in Southern Rhodesia)

EXPORTS BEGUN ON MODEST SCALE

MR. T. COULTER ON COAL PRICE AGREEMENT

The following extracts are from the statement by the Chairman, Mr. T. Coulter, which has been circulated with the annual report and accounts for the year ended August 31, 1957:

The profit for the year before taxation amounted to £1,227,050 as compared with £1,141,647 for 1956, being an improvement of £85,383.

The profit figure stated above represents the balance remaining after deduction of £288,511 surplus revenue in terms of the Coal Price Agreement, and does not take into account the increase in the profit margin per ton claimed by the Company in terms of the incentive clause of the Agreement. In the balance-sheet the amount of £288,511 deducted has been brought in as a special reserve less income tax on that amount, which has been separately shown under future taxation.

The balance of the contingency reserve, amounting to £65,000 and now no longer required, has been brought back as a credit in the profit and loss account.

Taxation absorbed £230,000 and a sum of £170,000 was transferred to taxation equalization reserve to provide for the higher incidence of taxation which will accrue when the "New Mine Allowance" in respect of No. 3 Colliery has been fully claimed. In terms of the Price Agreement, an amount of £285,000 was transferred to general reserve which now stands at £1,270,000.

Dividend No. 65 of 6d per share was paid in April, 1957, and dividend No. 66 of 7d per share was paid on October 11. The total distribution was £577,640 which represents 1s 1½d per share and compares with 1s per share paid last year.

Capital expenditure on fixed assets during the year, less sales, amounted to £718,932. The balance-sheet shows fixed assets at August 31, 1957, totalling £8,215,573. Current assets (excluding stocks and stores) at £3,019,252 as against current liabilities of £1,070,907 indicate a surplus of £1,948,345, represented by Federal Government stocks, loans and debentures.

Sales Output

The following tabulation gives a comparison of the sales of coal and coke for the past three years ended August 31:

	1955	1956	1957
	Tons	Tons	Tons
Coal	3,414,719	3,695,356	3,945,378
Coke	220,966	242,848	272,239

These figures indicate a rather disappointing slowing down in the rate of sales expansion towards the Company's target of over 5,000,000 tons per annum.

The average selling price of coal remained at 19s 6d per ton throughout the year, pending settlement of the Company's claim in regard to the basic cost of production, as affecting the margin of profit per ton in terms of the Price Agreement. This claim is the subject of arbitration proceedings between the Government of Southern Rhodesia and the Company, which we anticipate will commence early in December, 1957. In the mean-

time we have had to base the Company's profit margin for the year under review on the minimum amount provided for in the Price Agreement.

The Company was able in June to commence the despatch of coal to Lourenco Marques for export on a modest scale. The railways, however, have only been able to quote a temporary railage rate of 5,000 tons per month, which has not enabled us to plan for long term export contracts. The first shipload of approximately 7,000 tons left Lourenco Marques during September. Provided, of course, that truckage is regularly available there is every hope that the Company can build up a sound export business.

Medical and Health Services

The general health of the population has improved measurably. It is felt that this is largely due to the immense amount of work which has been carried out in the improvement of all medical services and public health needs of the community.

The introduction of waterborne sanitation throughout Wankie has had the immediate effect of practically eliminating typhoid fever, which has endemic in this part of Southern Rhodesia. The malarial incidence has also been reduced to a negligible figure. Another feature of the health programme was the establishment of kitchens in the main compounds of the colliery. Improvement in the health of the unmarried African employees is largely due to this innovation and the introduction of a balanced feeding schedule has had a marked effect in building up the resistance of the African against respiratory diseases.

Much attention has been given by all concerned to reducing the accident rates and the number of shifts lost as a result of accidents was reduced from 25,106 during 1954 to 6,170 in 1956, whilst the morbidity rate decreased from 89 per 1,000 Natives per annum in 1954 to 38 in 1956.

During 1956 all health centres and feeding centres were put into commission. These were established primarily for the dependants of the African workers and offer opportunities for normal midwifery, ante and post natal work, as well as providing an out-patients' department. Special arrangements have also been made to feed children of certain age-groups with a fortified meal each day.

Shareholders will be interested in the comparisons of output potential and actual current output of our three collieries as they now stand:

	Planned Capacity :		
No. 1	No. 2	No. 3	Total
tons	tons	tons	tons
1,200,000 2,200,000 2,200,000 5,600,000			
Present Production :			
1,052,780	2,070,171	822,427	3,945,378
Reserve Capacity :			
147,220	129,829	1,377,573	1,654,622

In order to achieve an output commensurate with the indicated potential, it would be necessary to employ additional European and African labour, but the collieries themselves and the general establishment are perfectly able to handle the higher tonnages. There is, of course, as mentioned last year, a reserve of some 100,000,000 tons of high-grade coal which given due notice could be mined by opencast methods.

Substantial capital expenditure would be necessary to meet the heavy cost of the appropriate machinery and equipment, and in view of the surplus capacity available from the established pits no

further consideration is being given to opencast mining at the present time.

At an output of 5,000,000 tons per year, the life of the proved reserves exceeds 90 years.

Relationships with our employees have remained on a very satisfactory basis reflecting perhaps the greatly improved living and working conditions which have been brought about for both Europeans and Africans.

NATIONAL MINING CORPORATION

The annual general meeting of National Mining Corporation, Ltd., was held on November 19 at Chartered Insurance Institute, London, E.C.

Mr. C. J. Burns presided.

The following is an extract from the Chairman's Statement circulated with the Report and Accounts for the year ended March 31, 1957:

The profit for the year under review of £63,585 (1956—£21,822) reflects the sale during the year of the Corporation's holdings in Premier Consolidated Oil-fields Limited.

During the year under review, uncertainties and depressed conditions in the mining market resulted in a fall in the value of the Corporation's quoted investments and at March 31, 1957, the depreciation stood at £56,425. Accordingly it has become necessary to write off this sum.

The value of unquoted investments at £172,565, shows an increase of £37,919.

It should be appreciated that these investments are much in the development stage and an immediate revenue in the form of dividends cannot, therefore, be expected from these sources. £30,000 is transferred to General Reserve, bringing this Reserve up to £50,000. The Directors regret that this action, together with the writing down of the quoted investments, does not permit a distribution of a dividend for the year but it will be appreciated that the measures taken will place the Corporation in a stronger position for the future.

Nigeria

Mines Development Syndicate (West Africa) Limited:—Further work has been done during the past year. The orebodies which have been revealed justified equipment of the property to mill 145,000 tons of ore per annum, but as an operation on this scale will require more capital than is likely to be available in the present phase of general financial stringency, it has been decided to bring ore blocks into production at the rate of 50,000 tons per annum. Proposals are now before the Nigerian Government to implement this revised scheme.

Canada

Since the close of the year opportunity has been taken to increase the Corporation's holdings in Canada in particular by the purchase of shares in Ladeo Company, Limited, a land acquisition and development Company operating in the Winnipeg area.

Your Corporation has interests in both industrial and mining development, and even though the pace is necessarily slow, the rewards in the shape of profitable investment should be eventually justified.

The report and accounts were adopted, and the proceedings terminated with a vote of thanks to the Chairman.

CONSOLIDATED AFRICAN SELECTION TRUST LIMITED

PROBLEM OF CONTINUALLY RISING COSTS

MR. A. CHESTER BEATTY'S REVIEW OF OPERATIONS

The 33rd Annual General Meeting of Consolidated African Selection Trust, Limited, will be held on December 12 at Selection Trust Building, Mason's Avenue, London, E.C.2.

The following is the Statement by the Chairman, Mr. A. Chester Beatty, which was circulated with the Report and Accounts for the year ended June 30, 1957.

Financial Results

The combined profit of the Company and its wholly owned subsidiary, Sierra Leone Selection Trust, Limited, for the year ended June 30, 1957, amounted to £2,197,000 against £2,247,000 for the previous year. Production costs continued to rise, principally due to more difficult mining conditions, but the decline in operating profit was to a large extent offset by an increase in the income from investments.

After providing £1,320,000 for taxation, which was substantially the same as last year, the net surplus was £877,000 compared with £861,000 last year.

You will notice one important change of principle in the Accounts this year. In calculating the trading results we have valued the opening and closing diamond stocks on the basis of their cost of production instead of at the nominal figure of £1. The surplus of £1,104,000 arising from the valuation of stocks at July 1, 1956, has been credited to General Reserve. A reserve of £847,000 has been created to cover the value of stores on hand at the end of the year. After taking into account taxation adjustments for previous years, adding the undistributed surplus of £504,000 brought forward from last year and appropriating £100,000 to General Reserve, £1,419,000 is available for distribution. An interim dividend of 1s. 6d. per unit of stock was paid on June 20, 1957, and we are recommending the payment of a final dividend of 3s. 6d., making a total for the year of 5s., less income tax, the same as last year. This will require a net sum of £872,000 and the balance carried forward becomes £547,000 compared with £504,000 brought in.

Capital Re-organization

During the past twenty years large amounts of profits have been retained in the business and used for financing the expansion of our operations. I therefore feel that the time has come when the issued capital of the Company should bear a closer relationship to the actual capital employed in the business, and proposals are being put before you which, if approved, will have the effect of capitalizing reserves and doubling the issued capital. The increase in capital will not affect the actual earning capacity of the Company's assets nor the total amount of dividends payable and the proportionate interest of each shareholder in the equity of the Company will remain unchanged. We also propose to reconvert the existing Ordinary Stock units of 5s. each into fully paid Ordinary Shares of 5s. each, so that after the capital reorganization all the issued Capital will be represented by fully paid

Ordinary Shares of 5s. each, without distinguishing numbers.

Operations in Ghana

During the year under review we treated over 25 per cent more gravel and recovered about the same quantity of diamonds, while working to a lower grade. This is in accordance with our policy to increase yardage throughput by mechanization and double-shift operations in order to extend the life of the Mine.

I am pleased to say that the year was free from disputes and our relations with the Ghana Mine Employees' Union were satisfactory. Since the end of the year, an increase in wages has been granted by the Company approximately in line with increases granted by the Government and other major employers.

New Development: Last year I told you that we had decided to implement plans for bringing into production deposits of a lower grade than had previously been mined and had authorized the erection of a new washing plant at Aninchebe. Construction has started on the new plant, which will eventually have an annual capacity of 300,000 cu. yds., and completion of the first half of the plant is scheduled for the middle of 1959. Revised estimates indicate that the total cost will be about £800,000.

We also have under consideration projects, which would involve heavy capital expenditure, for mining other areas in our concessions, but further research into the best methods of treating gravels and other preliminary work requires to be done before any decisions can be made.

Ghana Independence: Our Company was represented at the historic ceremonies which took place when Ghana achieved her independence on March 6 this year, and to mark the event we presented a set of silver salvers to the Government.

At a cost of £17,000 we have built and equipped a new Training Centre for artisans which we have offered as a contribution to the Ghana Independence Monuments Appeal Fund. This Centre will be run as part of the Mine's operations and will provide training facilities open to all young Ghanaians on a competitive basis.

I am glad to say that the relations between the Government and the Company continue to be excellent.

Operations in Sierra Leone

In Sierra Leone we treated a greater quantity of gravel than in the previous year and produced a larger caratage of diamonds. Our costs showed yet another marked increase, because apart from higher wages and salaries and the rising cost of our security forces, we were obliged to strip a much larger volume of waste, lying over deposits in which we are now working.

During the year there was a further increase in wages in the mining industry and yet another wage claim is being negotiated at the present moment. These wage claims are mainly caused by the continuing inflation in the country. The

effect on the costs of the industry is serious.

Our labour relations were satisfactory and I am pleased to say that all our employees remained loyal and continued to work during the serious disturbances which took place in August this year.

New Development: Construction continued throughout the year on the new Plant in the Tonga area, some distance away from our Mine Headquarters. We have equipped this plant as a largely self-contained unit, since it would have been impracticable to rely on the Mine Headquarters for most ancillary services, and it is now operating. The total cost is about £550,000.

Illicit Mining: In 1955, as a result of the negotiations with the Sierra Leone Government which radically altered our Licence Agreement, we received firm assurances that if our operations were confined within a smaller area, we would receive proper police protection from illicit mining. In spite of giving up the diamond rights over the whole of Sierra Leone except for our lease areas now totalling 303 sq. miles, illicit mining has continued to take place in our remaining areas notwithstanding considerably increased expenditure on our own security forces. The situation was aggravated early this year when owing to an error the Government granted licences to Sierra Leoneans to mine in part of our areas. We at once protested, but the Government did not withdraw the licences or evict the diggers, until a very dangerous precedent had been established.

In August this year there was a sudden large-scale incursion into our areas by thousands of illicit miners; one of our plants was invaded by a riotous mob and there was a serious breakdown in law and order throughout the district, which the police were unable to control. The Government moved reinforcements of police and military into the area and have since taken steps to restore the rule of law. There is unfortunately no doubt that damage has been done to the reserves on which we rely for future working.

A great deal has appeared in the world's Press about these recent disturbances, this being the third serious outbreak of lawlessness in Sierra Leone in the last three years, but the first directly attributable to diamonds. In each case the Government was unable to forestall the outbreaks and order was restored only after considerable damage had been done. Nothing is more likely than a state of lawlessness to discourage the investment of overseas capital and the employment of technical skill in Sierra Leone. I am therefore glad to say that a much increased police force has now been authorized by the Sierra Leone Government for operation in our areas on a permanent basis.

The Problem in Kono: Now that so many Sierra Leoneans are licensed to mine diamonds on their own account outside our leases, a means must urgently be found to satisfy the aspirations of the Kono district, where our operations are centred. For many years now we have paid large sums in taxation to the Sierra Leone Government, but it is unfortunately apparent that little of this revenue has been applied to the development of Kono.

Our own contributions to the area are considerable, by way of direct wages, social benefits, road construction and the provision of hospital services for which no charges are made. During the year

we opened up a new Artisan Training Centre, similar to our Centre in Ghana, and added a new Maternity Wing to our hospital. We have also asked the Government for permission to apply to specific projects in Kono the moneys which we formerly paid to the Protectorate Mining Benefits Trust Fund.

We shall continue to do all we can towards the development of this district, but clearly the main responsibility rests with the Government to whom we pay up to 60 per cent of our profits by way of taxes.

Africanization

In my view, the future power and prosperity of the West African countries, now achieving self-government, will depend in a large measure on the existence of qualified African technicians. We are therefore spending very appreciable sums in both Ghana and Sierra Leone on our own technical training schemes under full-time instructors and using the most modern equipment, as I feel that to fill responsible technical positions with unqualified men is both wasteful and demoralizing. We hope to train apprentices into first-class tradesmen and to select men for more advanced training on the mines and elsewhere. In addition to local training schemes, we now have several African students in this country who are being trained as mining engineers on scholarships granted by the Company. In Ghana, we have a Nurses' Training School at our Mine Hospital, and three of our staff have also been brought to this country in order to qualify as State Registered Nurses.

Taxation

Ghana Minerals Duty: I understand that a Bill to replace the present minerals duty in Ghana by a profits tax which will rank for double taxation relief in the United Kingdom is expected to be presented to the Ghana Parliament before the end of this year. I therefore have every hope that the problem of the unrelieved double taxation of our mining profits in Ghana which has troubled us for so long will shortly be removed. There will be a benefit from this new legislation even if this Company is in future regarded as an Overseas Trade Corporation for United Kingdom tax purposes.

Overseas Trade Corporation Status: Both this Company and its subsidiary, Sierra Leone Selection Trust, Limited, are at present prevented from being regarded as Overseas Trade Corporations under the provisions of the Finance Act, 1957. Our companies would benefit from Overseas Trade Corporation status and we are at present examining the possibilities of complying with the relevant provisions.

The Future

It is difficult to forecast the future profits of the Company, which depend on so many factors, and in common with all producers of raw materials we are faced with continually rising costs of production. The Company is, however, in a strong financial position and results for the current year should, in the absence of unforeseen circumstances, continue to be satisfactory.

Finally, I should like to record my thanks to our Management and Staff both at home and overseas for their loyal and successful efforts in frequently difficult conditions, and in particular to the Staff in Sierra Leone for their loyalty and fortitude during the crisis in that country.

THE PERAK RIVER HYDRO-ELECTRIC POWER COMPANY

CONTINUED STEADY EXPANSION

The 31st annual general meeting of The Perak River Hydro-Electric Power Company, Limited, was held on November 14 in London, Mr. Hugh C. Balfour (the chairman) presiding.

The following is an extract from his circulated statement:—

The expansion of the Company's business in Malaya during the year ended July 31, 1957, continued steadily. Gross revenue from the sale of current and miscellaneous income at £1,683,155 is the highest yet attained and is an increase of £64,685 over last year. However, increased operating costs account for the fact that the balance of £923,995 carried to the Net Revenue Account represents an increase of only 5.2 per cent over the corresponding balance last year.

The maximum system peak load recorded in the year was 70.1mW., which compares with 68.9mW. in the previous year, whilst the total number of units generated by the Company was 443.67 million, or an overall increase of 1.72 per cent. The steam power stations at Batu Gajah and Malim Nawar together generated 243.84 million units during the year, compared with 241.06 million, whilst owing to a heavier rainfall resulting in an increased effective river flow, the Chenderoh Station generated 199.83 million units, or 2.42 per cent more than previously.

The overall thermal efficiency of the two steam stations increased from 18.14 per cent to 18.25 per cent. It is anticipated that the overall efficiency of the Company's plant should be considerably improved when the two new 12 mW. generating sets and ancillary boiler plant now on order come into operation. The first of these two new sets should be available during the present financial year, and the second set should be ready for service during the first half of 1959.

The total number of consumers connected to the Company's system is 231, including 33 dredges. In addition, our subsidiary company, the Kinta Electrical Distribution Company, Limited, which had another satisfactory year of expansion, provides a supply of electricity to 64 towns and villages.

The continued necessity for security precautions and actual military operations in the Company's area of supply still hamper the work of our maintenance and distribution staff from time to time, but I am pleased to say that no damage was caused to the Company's property during the year.

In view of the probable growth of load on the Company's system during the next ten years, and of the need gradually to replace older units of generating plant, your Directors have under close consideration the provision of further new generating plant beyond the two new sets now on order.

The constitutional changes which took place in Malaya last August in such harmonious circumstances, and the practical and friendly arrangements subsisting between Malaya and the United Kingdom, give solid reasons for thinking that the future holds great possibilities for expansion and development in Malaya.

The report and accounts were adopted, and a final distribution of 8½ per cent was approved, making 12½ per cent for the year.

Company News and Results—Continued

Griqualand Exploration.—In the year to May 31, 1957, group net profits of Griqualand Exploration and Finance Co. rose to £128,805 from £109,797 previously. The recommended dividend is 3d. higher at 1s. 6d. per share. The chairman, Mr. L. G. Ray, in his circulated statement, says that output from the South African company developing an asbestos property in the vicinity of Kuruman is now increasing, and that it will make a contribution to earnings in the near future. Meeting: London, December 12.

F.S. Geduld Rights Issue.—Details of the issue by F. S. Geduld of 1,201,246 shares at 80s. originally announced in June, 1956, have now been released. Anglo American will have the right on December 31 to subscribe for 497,346 shares as consideration for the £5,000,000 loan facilities granted in 1956, while the issue to shareholders will be in the form of "rights" at the rate of two new shares for every twenty-five held. Treasury consent has been received.

View From The Lake.—Lake View and Star, Australia's largest gold producer, make their debut as an O.T.C. in a year when profits declined from £444,000 to £419,000. Provision for current taxation is thereby reduced from £235,500 to £115,000, and £158,000, which stood in last year's balance sheet as a provision for taxation, is written back as no longer required. The final dividend of 1s. 9d. makes 2s. 6d. for the year against 2s. last year. It is pointed out that non-resident shareholders will only be able to recover about one-

quarter of the tax deducted from dividends in respect of the year ended June 30, 1957, as the O.T.C. provisions came into operation on April 6. Meeting, London, December 19.

Sungel Way Cuts Payment.—Sungei Way Dredging are to recommend a final dividend of 10 per cent at their annual general meeting to be held in Kuala Lumpur on December 9. This makes 20 per cent for the year and compares with a final of 20 per cent and a total of 60 per cent last year.

B.I.C.C. Hit By Copper Stump.—An interim statement from British Insulated Callender's Cables for the first half of this year reveals a dip in profits after tax to £1,184,000 from £1,634,000 in the preceding six months and £1,799,000 in the corresponding period last year. This, says the chairman, Mr. W. H. McFadzean, is due to the general fall in profit rates, replanning and re-equipment schemes, and the effect of the drooping copper price on stocks. Future prospects, the chairman says, must, at least in the short term, be viewed with caution, but from the longer term aspect, "the trend of demand in the industry must be upwards".

New Modder Sells Its Remnants.—Hard on the heels of their report for the year to June 30, 1957, New Modderfontein Gold Mining have announced that they have accepted an offer for the purchase of the company's remaining assets (freehold property, mining village, railway siding, waste dumps and sundry removable property) for the sum of £100,000 payable in three instalments subject to certain suspensive conditions.

At the ordinary meeting shareholders were asked to approve a resolution returning 6d. per share, thus reducing the par value from 3s. to 2s. 6d.

New Union Gold Fields.—Profits after tax of New Union Gold Fields in the year to June 30, 1957, were virtually unchanged at £17,138. However, the true position is somewhat worse than would appear from this figure in that only £172,785 has been written off investments against £525,628 last year. The chairman, Mr. M. E. Rich, reports that drilling on the composite area known as the Carolina Block was completed with the providing of some 62,000,000 tons of good household and industrial coal over a seam width of about 72 in. The option to purchase the coal rights was therefore exercised, the whole operation, including drilling, costing £68,000. The company is considering the practicability of opening up its own colliery in this area. Meeting: Johannesburg, December 11.

Broken Hill Issue.—Terms of the Broken Hill Proprietary issue have now been announced. The basis will be one new share at 20s. (Australian) for each five held on December 24. Of the subscription, 10s. was payable on application in February and 10s. in September, 1958. The shares will be entitled to half the dividend (if any) payable in November, 1958, and the whole of any dividends thereafter. A surprising point is that the issue will not be underwritten.

Huelva Copper and Sulphur.—Huelva Copper and Sulphur Mines are to recommend a dividend of 22½ per cent for the year ended June 30, 1957. Profit for the year was £40,263 against £34,653.

Mine Returns

WEST AFRICAN GOLD

Company	July-Sept., 1957			Current Financial Year Total to date			Last Financial Year Total to date		
	Tons (000)	Yield (oz.)	Profit (£'000)	Months since Year end			Tons (000)	Yield (oz.)	Profit (£'000)
				Total	to date	Year end			
Amal Banker	179	38,629	90·8	12	697	142,530	300·4	632	105,777 162·9
Ariston	117	38,104	157·6	12	470	143,474	559·0	328	90,023 319·2
Ashanti	86	71,200	346·9	12	335	273,522	1343·7	216	183,406 649·1
Bibiani (1927)	90	19,500	20·6	12	360	77,900	96·5	259	38,983 17·5
Bremang*	1972	11,134	45·9	9	5,642	29,172	96·6	6,760	30,558 104·9
Ghana M. Ry	36	12,036	40·8	3	36	12,036	40·8	36	10,617 28·5
Konongo	15	11,763	48·3	12	59	47,133	192·6	29	19,176 134·7

* Cu. yds. dredged

COAL OUTPUT

Company	3 Months to Sept. 30 (in tons)	Months since Year End	Cumulative Totals (in tons)	
			This year to date	Last year to date
Amal. Coll. of S.A.	1,673,643	9	4,822,785	4,877,346
Apex	218,814	9	678,532	648,450
Blesbok	158,942	9	466,841	465,860
Coronation	310,707	9	896,505	808,456
Natal Navigation	312,212	3	312,212	284,760
New Clydesdale	281,787	3	281,787	215,729
New Largo	317,635	9	918,253	1,058,687
S.A. Coal Estates	434,207	3	434,207	407,755
Springbok	264,054	9	696,517	661,266
Transvaal & Delagoa	357,000	1	119,196	112,203
Van Dyks Drift	166,248	9	487,868	501,660
Vierfontein	368,458	9	1,085,371	1,135,026
Vryheid Cor.	162,836	9	478,263	463,454
Vryheid Cor.*	123,070	9	368,746	387,606
Wankie	1,302,273	1	313,028	315,567
Wankie*	66,624	1	22,154	20,757
Witbank	415,485	9	1,296,220	1,319,169

* Coke

WOLVERHAMPTON DIAMOND DIE & TOOL Co. Ltd.

BOARTS
and
INDUSTRIAL
DIAMONDS
Exporters

II HATTON GARDEN,
LONDON, E.C.1.

Telephone: HOLborn 3017 Cables: Pardimon, London



SANDVIK COROMANT— A Complete Range of Drill Steel Equipment

You know as well as we do the advantages of buying all your drilling equipment from one supplier. These advantages become still more evident if you buy from the Sandvik Range. The Sandvik Steel Works are the world's largest manufacturers of tungsten carbide for rock drilling. Their production covers integral steels, detachable bits, extension steels and stone working tools—all made of high-quality Swedish alloy steel, all fitted with the well-known Coromant tungsten carbide inserts.

Integral steels with 50% longer life

Sandvik Coromant integral steels have up to 50% longer rod life than ordinary steels, thanks to anti-corrosion SR-treatment, which protects them during transport, storage and actual drilling. In addition, air-tight plastic caps give bit and shank extra protection during transport and storage. They are available in these standard sizes:—

$\frac{3}{4}$ " hollow hexagon	1'4"-13'1"
$\frac{5}{8}$ " hollow hexagon	1'4"-21'0"
1" hollow hexagon	2'6"-21'0"
Flexible drill steels	2'7"-31'6"

Precision-made rock bits

The threads of Sandvik Coromant (cross and X-design) bits are precision milled. The bits are so accurately manufactured that not only smoother drilling but *longer life* are ensured. Standard bit diameter sizes range from $1\frac{1}{2}$ " to $4\frac{1}{2}$ ". The 773 bits (bottoming type) are available with GD400 and GD600 thread, or with $1\frac{1}{4}$ ", $1\frac{1}{2}$ " and 2" rope thread. The 776 bits, for standard shoulder-type drill rods, are available with threads ranging from $\frac{7}{8}$ " to $1\frac{11}{16}$ ".

Efficient extension steels

The rope-threaded joints of Sandvik Coromant extension steels are solid and make joining and unscrewing extremely easy. Sizes available: $\frac{7}{8}$ " and 1" hexagon steels, $1\frac{1}{4}$ " and 2" round steels. A special feature of the $1\frac{1}{4}$ " equipment is the $\frac{1}{2}$ " flushing hole, about twice as large as most. This gives better cleaning of the bore hole and a higher rate of advance, reduces wear and risk of steels sticking. The 'cold rolling' technique makes this wider flushing hole possible without any loss of strength.

Wide variety of Stone Working Tools

A single plug hole steel made by Sandvik is capable of drilling up to 1000 holes, each about 3.9". Sandvik Chisel Steels are made with rubber sleeves to reduce vibration and protect the worker. Sizes available: Plug Hole Drill Steels with bit diameters ranging from approx. $\frac{31}{32}$ " to $\frac{7}{8}$ ". Chisel steels with bit diameters from approx. $\frac{5}{16}$ " to $\frac{33}{32}$ ".

The World's foremost drilling unit

Sandvik Coromant extension and drill steels have been developed in close co-operation with Atlas Copco, manufacturers of rock drills and other compressed air equipment. The combination of Sandvik steels and Atlas Copco rock drills is the world's most widely used drilling unit—responsible for the drilling of more than one thousand million feet each year!

The Sandvik Coromant accessories featured here are sold and serviced throughout the world by the Atlas Copco Group of Companies. We have mentioned only the most important products and sizes: for further details, please contact your local Atlas Copco Company or Agent, or write to Atlas Copco AB, Stockholm 1, Sweden.

Atlas Copco Manufacturers of Stationary and Portable Compressors,
Rock-drilling equipment, Loaders, Pneumatic tools and Paint-spraying equipment.

THE CEMENTATION COMPANY

INCREASED PROFITS NEW ISSUE PLANNED

MR. A. R. NEELANDS'S REVIEW

The thirty-seventh Annual General Meeting of the Cementation Company, Ltd., will be held on December 10 in London.

The following is an extract from the Statement by the Chairman, Mr. A. R. Neelands, circulated with the report and accounts for the year to March 31, 1957:

The trading Profit (after all charges other than tax) of the Group for the year ended March 31, 1957, is £932,698 as compared with £681,065 for the previous year.

Our order book stands higher than it has ever done and subject to the future effect of the rise in the Bank Rate, the maintenance of international trade and Government restrictions on our worldwide activities, the trend of our business is encouraging.

The financing of increasing turnover continues to place a serious strain on the resources of the Company. With your consent we propose to pay a Dividend of 12½ per cent. The incidence of taxation today is such that the continued expansion of our business cannot be met by the ploughing back of profits and your Directors are considering the raising of further funds. The details of the method are not yet final, but approval of the Capital Issues Committee has been obtained for the raising of further capital and you will see that on the Agenda

there is a Resolution increasing the Company's authorized capital by £1,500,000 so that there will be sufficient unissued capital to cover the increase and at the same time provide a balance of unissued capital for the future.

Parent Company Activities

This has been a busy year for the Parent Company and all our Departments and Branches have been working to capacity both at home and abroad.

Civil engineering construction in India, where we are associated with the Patel Engineering Company, Limited, of Bombay, has increased this year and satisfactory results are being obtained from a number of contracts in progress.

Mining work entrusted to us by the National Coal Board has again increased although its character is beginning to change. In some parts of the country the shaft-sinking programme may have passed its peak and the next phase of underground development, involving the driving of tunnels, has commenced, particularly in the new collieries which are to be worked by the horizon method. During the year shaft sinking was completed at Kinnel, Rising Sun and Rufford. At Rothes coal production has begun although some further shaft sinking has still to be completed. We have been awarded further contracts for shaft sinking in the Midlands. Your engineering staff have developed and hold patents on pneumatic cactus grab spoil loading units, some twelve of which have been in use at our sinkings during the year. Simultaneously your Company's engineers from South Africa have designed two-stage sinking scaffolds, multiple drill equipment and other devices.

Of our many tunnelling achievements in coal mines one at Goldthorpe Colliery driven at 1 in 9 downgrade handled five million gallons of water per day and was advanced 63 yds. in one working week, including lining with steel arches and concrete.

During the year shaft sinking was continued in Turkey.

The volume of piling work carried out in the British Isles exceeded last year's record figure by a large margin. There are numerous openings abroad for our piling systems and our overseas commitments for piling are increasing rapidly.

Competition in the field of cementation work proper has been successfully countered by improving the efficiency of our operations in this field, and by extending our activities to specialist works allied to or derived from our cementation processes. In this connection we have been successful in developing and exploiting economical means of consolidating old mine workings at shallow depths by working from the surface, in anchoring heavy-duty cables for pre-stressing and post-stressing various structures, both in rock and relatively soft strata, and in specialist applications of both lightweight and extra heavyweight grouts for various constructional requirements. The volume of cementation work carried out within the United Kingdom showed a substantial advance on the previous year. The Dokan Dam cementation contract in Iraq—a Joint Venture under our direct supervision—has made excellent progress and is ahead of programme.

The Drilling Department has also done exceptionally well and it is pleasing to note that the volume of work for new clients is expanding.



NATIONAL OVERSEAS AND GRINDLAYS BANK LIMITED

The National Bank of India Limited and Grindlays Bank Limited announce that on the amalgamation of the two companies from 1st January, 1958 it is the intention, subject to the passing of the necessary resolution by the shareholders in general meeting, for the business of the combined banks to be carried on in the new name of National Overseas and Grindlays Bank Limited with its Head Office at 26, Bishopsgate, London, E.C.2.

The present London business of Grindlays Bank Limited will continue to be carried on at 54, Parliament Street, London, S.W.1 and 9, Tufton Street, S.W.1 under the new name in the same manner as at present.

NATIONAL BANK OF INDIA LIMITED	WEST END (LONDON) BRANCH	GRINDLAYS BANK LIMITED	SHIPPING, PASSAGE AND INSURANCE
Head Office: 26, Bishopsgate, E.C.2.	13, St. James's Square, S.W.1.	Head Office: 54, Parliament Street, S.W.1.	DEPARTMENTS
Telephone: London Wall 4040	Telephone: Whitehall 9691	Telephone: Whitehall 1462	9, Tufton Street, S.W.1. Telephone: Abbey 1771

Branches in: INDIA • PAKISTAN • CEYLON • BURMA • KENYA • TANGANYIKA • ZANZIBAR • UGANDA • ADEN • SOMALILAND
PROTECTORATE • NORTHERN AND SOUTHERN RHODESIA

Bankers to the Government in: ADEN • KENYA COLONY • UGANDA • ZANZIBAR AND SOMALILAND PROTECTORATE

